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INTERACTION IN VITRO OF FIBROBLASTS AND SARCOMA CELLS WITH LEUCOCYTES AND MACROPHAGES

BY

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The study of tissue cultures of tumours has strikingly demonstrated what is also obvious in histological sections—that malignant tissues contain relatively large numbers of lymphocytes, monocytes, and macrophages. As to the role of these cells in tumour growth there has been a variety of opinions. Thus, Da Fano's (1912) histological study of spontaneously regressing tumours, and tumour grafts in resistant animals, led him to write of lymphocytes "that their intimate connexion with the development of immunity [to tumour growth] appears certain." Murphy's (1926) experimental studies led him to a similar conclusion —"that we have in the lymphoid elements an important link in the chain of the processes which determine resistance to cancer." Carrel investigated the problem by means of tissue culture. His work led him to a different conclusion—that "leucocytes secrete substances *in vitro* which promote cell multiplication." These substances he called "trephones." His evidence was derived from two types of experiments—growing leucocytes, together with fibroblasts, and also preparing extracts from leucocyte cultures and testing them on cultures of fibroblasts. When a fragment of spleen was grown close to a culture of fibroblasts it was observed that the fibroblasts, which after some days became enlarged and loaded with fat droplets, underwent a change when the leucocytes from the spleen culture reached them. They became slender and elongated, their cytoplasm increased in volume, and they began to proliferate actively (Carrel and Ebeling, 1923). Extracts of leucocytes were prepared by different methods. The blood of chicks was centrifuged and the leucocytes collected, washed, and stored in Ringer's solution in an ice-box for several days; then the suspension was shaken up, centrifuged, and the supernatant fluid applied to cultures of fibroblasts. Control cultures were treated with embryo extract, and others with Ringer's solution. The leucocyte extract was found to have the same growth-promoting property as embryo extract. Another extract was made from forty-eight-hours-old cultures of buffy coat grown on a clot of fowl plasma. Serum was extracted from this clot and also from another plasma clot incubated without leucocytes. The action of the two lots of sera was tested on cultures of fibroblasts. "The fluid from the medium which had contained leucocytes was markedly more active" (Carrel, 1922). The action of macrophages on the growth of malignant cells was demonstrated by explanting the two halves of a colony of rat sarcoma cells (Crocker rat sarcoma No. 10) some distance apart, and planting by the side of one a small piece of bone marrow. The sarcoma fragment in contact with the bone marrow became partially surrounded by macrophages and grew vigorously, while the isolated fragment of sarcoma only grew feebly for a short time. Carrel also inoculated pure cultures of the sarcoma cells into the subcutaneous tissues of a rat. One culture was removed and explanted after twenty-four hours, before the sarcoma cells had become infiltrated with macrophages. Another culture was removed and explanted after four days. Macrophages had invaded this culture, and it grew more vigorously than the other (Carrel, 1927). In whatever manner lymphocytes may participate in the cellular mechanism involved in resistance to malignant growth the substantial evidence adduced by Carrel admits of only one interpretation—that leucocytes do not normally inhibit the growth of normal and malignant cells, but, on the contrary, stimulate their growth.

One of the most distinctive features of malignant tissues grown *in vitro* is the rapidity with which they digest clotted plasma. The possibility that increased liquefaction might also result from the stimulatory action of mononuclears led to this reinvestigation of the interaction of leucocytes with normal and malignant cells.

General Technical Procedure

All the tissue cultures employed in these experiments were grown in Carrel flasks. The culture media consisted of fowl plasma and chick embryo extract. The embryo extract was prepared by crushing to a pulp twelve chick embryos from eggs of nine to eleven days' incubation. This pulp was well stirred with 50 c.cm. of Tyrode's solution, then pipetted into centrifuge tubes. After allowing the tissue debris to settle, the volume of Tyrode's solution was made up to four times that of the tissue and stirred again. The tubes were centrifuged, and the supernatant fluid constituted the stock solution. This was diluted further with Tyrode's solution to the extent of 6 and 20 per cent.

In setting up cultures in large flasks (5 cm. in diameter) 0.6 c.cm. of plasma was pipetted into each flask: then 1.8 c.cm. of embryo extract was added and mixed with the plasma. Before clotting was completed the tissue fragments (approximately 1 sq. mm. in size) were introduced. For comparing the growth of fibroblasts and sarcoma cells (F) in the presence and in the absence of leucocytes (L) the tissue fragments were spaced as follows:

		F				F				L	
F			F		L			L	L		L
F			F		F			F	L		L
		F				L				L	

Leucocyte cultures were prepared from the buffy coat of fowl blood by Carrel's method.

Growth of Fibroblasts in Presence and Absence of Leucocytes

When fibroblasts are explanted alone and also together with leucocytes it is found that in the latter case the growth of the fibroblasts begins sooner, is more extensive, and continues for a longer period. Also, the presence of leucocytes stimulates the fibroblasts to digest the plasma. This first experiment illustrates these phenomena. The tissues explanted were buffy coat from an adult hen and pectoral muscle from a two-weeks-old chick. This muscle tissue was used as a source of fibroblasts in preference to embryonic muscle, since cultures of the latter tend to be contaminated with myoblasts.

Cultures were set up as follows:

A. 7 flasks, each containing 6 explants of buffy coat —42 explants
B. 5 flasks, each containing 6 explants of pectoral muscle—30 explants
C. 7 flasks, each containing { 3 explants of buffy coat —21 explants; 3 explants of pectoral muscle—21 explants }

On the following day embryo extract was added as nutrient medium.

By the fifth day it was obvious on superficial examination that the growth of fibroblasts in C was more extensive than in B. Many of the muscle explants in C had begun to liquefy the plasma. All the cultures were washed and re-fed.

On the ninth day all the fibroblast cultures of C were liquefied to varying extents. Liquefaction of fibroblast cultures had also begun in B. Some slight liquefaction of the buffy coat cultures of A had also occurred, the result of the disintegration of the explants. There was a distinct difference between the fibroblasts growing in the presence and those growing in the absence of leucocytes. The latter contained numerous fat droplets. Around the periphery of the cultures the cells appeared larger than those in the flasks containing both leucocytes and fibroblasts. In the latter cultures the fibroblasts had few or no fat droplets. The whole cultures appeared more translucent. The peripheral cells were spindle-shaped and radiated outwards into the surrounding medium. Areas of liquefaction were bordered by a zone of clear spindle-shaped fibroblasts. Liquefaction of the plasma of the flasks containing only fibroblasts did not begin until the cultures had almost attained their maximum growth, but in the flasks containing both fibroblasts and leucocytes liquefaction started earlier, and both liquefaction and growth were progressive.

On the twelfth day representative flasks from each group were fixed and stained. Three of these flasks are shown in Fig. 1. The first flask contains only cultures of leucocytes,

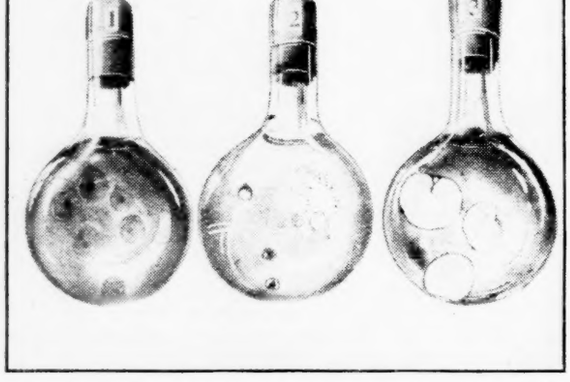

FIG. 1.—Twelve-days-old cultures of leucocytes (1), fibroblasts (2), and leucocytes together with fibroblasts (3), showing the more extensive growth and liquefaction of plasma when the two types of cells are grown together in contact.

the six explants being visible as large dots; the second flask contains six cultures of fibroblasts with small areas of liquefaction; while in the third flask are seen the large liquefied cultures of fibroblasts resulting from the presence of leucocytes.

By the eighteenth day most of the remaining cultures of leucocytes were degenerate, with cells filled with fat droplets. A few cultures still exhibited relatively healthy-looking monocytes, and there were a number of multinucleate giant cells present. All the cells in the flasks containing fibroblasts alone appeared degenerate. Very different was the state of the cells in the flasks containing both leucocytes and fibroblasts. Liquefaction of the plasma by the fibroblasts had continued; but the fibroblasts around the peripheries of the liquefied areas and others adherent to the bottom of the flasks in these areas were cells with clear cytoplasm with scarcely any fat droplets. They mostly retained their spindle shapes, except when flattened out on the surface of the glass. Owing to the extensive liquefaction of the plasma the buffy coat explants were displaced; but monocytes and macrophages, together with multinucleate giant cells, were scattered among the fibroblasts, and were also adherent to the surface of the flasks in the liquefied areas. These cells were obviously in a much more healthy state than those in the flasks containing only cultures of leucocytes. The extent of the liquefaction and growth of fibroblasts alone, and of fibroblasts with leucocytes, is shown in Fig. 2, which represents a reduction of

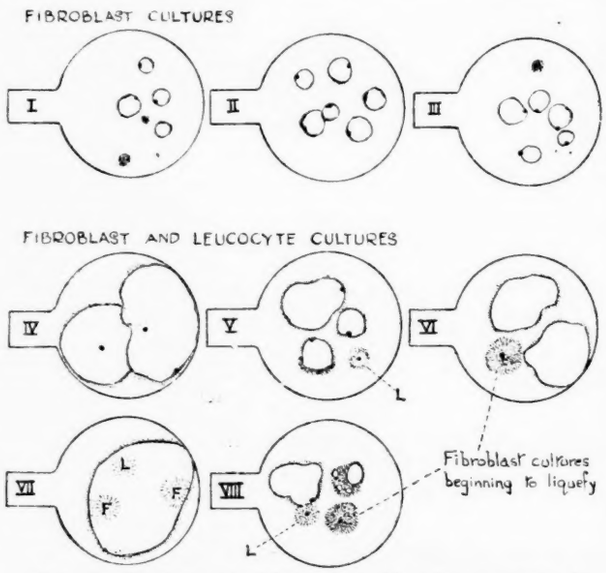

FIG. 2.—Tracings of eighteen-days-old cultures grown in flasks. I–III show the extent of growth and liquefaction of cultures of fibroblasts. IV–VIII show the greater growth and more extensive liquefaction in mixed cultures. In VIII are growths of fibroblasts (F) and leucocytes (L) on the surface of the glass in the liquefied area.

tracings made from each of the remaining flasks. The following table summarizes the progressive liquefaction of the cultures:

		No. of Cultures Liquefied			
		5th Day	7th Day	8th Day	9th Day
A. Leucocyte cultures	42 explants (7 flasks)	0	0	0	5 explants
B. Fibroblast cultures	30 explants (5 flasks)	0	0	0	3+ 14 starting
C. Leucocytes ..	21 explants	0	—	—	—
C. Leucocytes + Fibroblasts ..	21 explants (7 flasks)	9	16+ 2 partially	18	18+ 3 partially

Below is summarized another experiment in which the progressive growth of the cultures was measured with the aid of a graduated eyepiece. The units are therefore purely arbitrary, and the numbers given are significant only for comparative purposes. The average width of the outgrowth from each explant was recorded. From these readings was calculated the average width of the outgrowth from the fibroblast cultures, with and without leucocytes. In the table which follows these averages are given together with the number

of cultures liquefied at various intervals from the start of the experiment. The technique of the experiment was as follows:

First Day.—Similar tissues explanted in the same manner as in the previous experiment. *Second Day.*—Embryo extract was added. *Fourth and Eighth Days.*—Cultures were washed and re-fed.

Summary of Results

		6th Day	8th Day	9th Day	11th Day
Fibroblasts (alone): (42 explants)	Number of cultures liquefied	0	1 (slight)	1 (slight)	1 (slight)
	Average growth of cultures (x)	0.12	0.57	0.96	1.49
Fibroblasts (with leucocytes): (21 explants)	Number of cultures liquefied	1	10 begun	13 advanced	20 extensive
	Average growth of cultures (y)	1.14	2.09	2.62	Measurement not possible
Ratio y/x		9.5	3.7	2.7	

These figures demonstrate the more rapid initial growth of fibroblasts in the presence of leucocytes and also the early onset of liquefaction in such cultures. It must be pointed out, however, that it is not possible to measure with any degree of accuracy the extent of growth of cultures after liquefaction has begun.

Growth Stimulation and Liquefaction of Plasma

Reference has been made to Carrel's experiments with extracts from leucocyte cultures. This was repeated in a modified manner. Eight flask cultures of pectoral muscle and eight of buffy coat were prepared as previously described. Each flask contained eight explants. Two days after explantation embryo extract was added. Four days later the fluid was collected from the leucocyte cultures and allowed to stand for any tissue debris to settle down. Both leucocyte and fibroblast cultures were then washed with Tyrode's solution, and to four of the flasks containing fibroblast cultures 1.2 c.cm. of the fluid from the leucocyte cultures was added, and to the other four 1.2 c.cm. of embryo extract. There were thus thirty-two fibroblast cultures which had been re-fed with embryo extract and the same number re-fed with the fluid from the leucocyte cultures. There was no appreciable difference in the subsequent rate of growth of the sixty-four cultures or in the maximum size attained by them. Although the fluid from the leucocyte cultures had the same growth-stimulating properties as the embryo extract it did not induce liquefaction.

The possibility suggested itself that it might be some product of the metabolism of fibroblasts that was required by leucocytes to induce them to produce some substance with the property of stimulating proteolysis by fibroblasts. The following experiment was therefore performed.

The fluids from three flasks containing fibroblast cultures and from three flasks containing leucocyte cultures were collected separately four days after the first addition of embryo extract. The cultures in the six flasks were washed with Tyrode's solution. Then the fluid from the leucocyte cultures was added to the flasks containing the fibroblasts, and the fluid from the fibroblast cultures added to the flasks containing leucocytes. Four days later the fluids from the two different kinds of cultures were collected again separately. After washing the cultures with Tyrode's solution the fluid which originally came from the flasks containing the fibroblasts was returned to these flasks, and the fluid which originally came from the leucocyte flasks was returned to them. After this procedure there was still no liquefaction of the plasma by either fibroblasts or leucocytes.

From these experiments it seems justifiable to conclude that leucocytes produce some substance or substances which stimulate the growth of fibroblasts, but that there is no evidence that the growth stimulation is responsible for the increased digestion of plasma which occurs in the presence of leucocytes. There is, of course, the possibility that leucocytes do produce some substance which is responsible for stimulating proteolysis but that this substance is extremely labile, or, alternatively, that my attempts to demonstrate such a substance failed because it was not present in a sufficiently high concentration. Examination of flasks of mixed cultures, however, has led me to believe that actual contact between leucocytes and fibroblasts is necessary in order to bring about the increased digestion of plasma. The experiment to be next described supports this view.

Cultures were prepared from pectoral muscle and spleen of a three-weeks-old chick. Embryo extract was added to all the flasks the day following explantation. From spleen explants there grew out in addition to fibroblasts lymphocytes, monocytes, and later macrophages. It was obvious during the first week that the growth of fibroblasts was more rapid and more extensive from fragments of spleen. The various cultures in the flasks grew separately as isolated colonies of cells. The condition of the colonies on the twelfth day is summarized below:

Muscle explants alone —— Growths of fibroblasts —— 40 cultures (6 flasks) —— No liquefaction

Spleen explants —— Growths of fibroblasts + leucocytes —— 18 cultures —— 14 completely and 4 partially liquefied

Muscle explants —— Growths of fibroblasts —— 21 cultures (6 flasks) —— No liquefaction

In other experiments in which spleen and muscle explants have been grown close together, and leucocytes from the spleen cultures have infiltrated the sheets of fibroblasts, the latter have digested the plasma. These experiments therefore confirm the conclusion that, while leucocytes produce substances that stimulate the growth of fibroblasts, actual contact between the two types of cells is necessary to cause an increase of the fibroblasts' proteolytic capacity.

Interaction of Leucocytes and Sarcoma Cells

For investigating the action of leucocyte cultures upon sarcoma cells I have employed Gye's fowl sarcoma R.F.D.2, which was originally induced in a fowl by the injection of dibenzanthracene. When this tumour is explanted there is a considerable outgrowth of monocytes and macrophages. After subculturing several times these cells are eliminated, leaving pure cultures of the sarcoma cells. Considerable difficulty has been experienced in maintaining such cultures for any length of time. It has been found that after the elimination of the monocytes and macrophages the sarcoma cells do not liquefy plasma much more rapidly than do normal fibroblasts.

Growing buffy coat cultures together with cultures of the sarcoma does not accelerate appreciably the rate of or increase the extent of proteolysis by this tumour. In my experiments there would appear to have been enough monocytes and macrophages in the primary tumour explants to induce the maximum stimulation of proteolysis. When, however, leucocytes and sarcoma cultures were grown together in flasks there was more extensive growth of the malignant cells than when sarcoma cultures were grown alone. In the following experiment that

increased growth of fibroblasts and sarcoma cells in the presence of leucocytes was compared.

The tissues explanted were pectoral muscle from a two-weeks-old chick, buffy coat, and sarcoma R.F.D.2. These tissues were explanted thus:

Three flasks each of:
A. 6 explants of pectoral muscle
B. 3 explants of pectoral muscle plus 3 explants of buffy coat
C. 6 explants of sarcoma
D. 3 explants of sarcoma plus 3 explants of buffy coat

Embryo extract was added to each flask on the second day. All the flasks were washed and re-fed on the eighth day. Three weeks from the beginning of the experiment, after all growth had ceased, the total width of each culture of muscle and of sarcoma was measured. From these figures were calculated the average diameters of the cultures of fibroblasts and sarcoma cells, alone and in the presence of leucocytes. These were:

A. Fibroblasts alone .. .. 9.2 mm. } 1 : 1.4
B. Fibroblasts + leucocytes .. 13.0 mm. }
C. Sarcoma .. .. .. 5.4 mm. } 1 : 1.3
D. Sarcoma + leucocytes .. 7.2 mm. }

The results of a repetition of this experiment, in which only sarcoma R.F.D.2 alone and together with buffy coat was grown, are given in the table below. The measurements were made in arbitrary units in the manner described in a previous experiment. In addition to measuring the outgrowth of sarcoma cells the outgrowth of the wandering cells was recorded.

		3rd Day	5th Day	9th Day	13th Day
Sarcoma alone: 42 explants (7 flasks)	No. of cultures liquefied	0	14%	50%	60%
	Growth of sarcoma cells	0.7	1.5	2.7	2.8 (1)
	Outgrowth of monocytes and macrophages	1.0	1.5	2.4	2.2*
Sarcoma: 27 explants in 9 flasks, with equal number of buffy coat explants	No. of cultures liquefied	0	5%	25%	56%
	Growth of sarcoma cells	0.6	1.4	3.2	3.9 (1.4)
	Outgrowth of monocytes and macrophages	0.8	1.5	1.8	1.8

* Less than previous figure owing to degeneration.

In this experiment the buffy coat cultures grew quite apart from the sarcoma cultures. The table shows that there was no increase of liquefaction by the sarcoma cultures. Liquefaction was actually slower. This was possibly the result of the slower rate of outgrowth of the wandering cells. A possible explanation of the greater size ultimately attained by sarcoma cultures in the presence of buffy coat is that the macrophages from the latter remain in an active functional state for a longer period.

In old cultures of leucocytes and sarcoma cells the latter appear more healthy than when grown alone. This is more obvious when the culture medium is not changed for a long time. The more active physiological state of the cells under these conditions is illustrated by the following experiment, in which old cultures were inoculated into chicks.

Small Carrel flasks (1.25 cm. in diameter) were employed. Into each was introduced 0.9 c.cm. of 6 per cent. embryo extract and 0.3 c.cm. of plasma. There were explanted six flasks each of:

A. 4 explants of pectoral muscle of a two-weeks-old chick
B. 2 explants of muscle plus two explants of buffy coat
C. 4 explants of R.F.D.2 sarcoma
D. 2 explants of sarcoma plus two explants of buffy coat

Two days later 0.4 c.cm. of 20 per cent. embryo extract was added to each flask. They received no further treatment except daily tilting backwards and forwards to keep the fluid uniform. On the sixty-first day the cultures were measured in arbitrary units as previously described. The averages then were:

A. Fibroblasts (alone) 6.2
B. Fibroblasts with leucocytes 8.8
C. Sarcoma (alone) 4.3
D. Sarcoma with leucocytes 6.4

By this time the cultures had obviously passed their prime, but the cells in the mixed cultures were clearly in a better state than in the others. On the next day the three flasks with the best cultures of sarcoma cells were chosen from the flasks containing sarcoma alone and sarcoma with leucocytes. The plasma clots were removed from the flasks and the sarcoma cultures cut out. These cultures were inoculated into the breast muscle of young chicks: three cultures from each flask containing sarcoma alone into the left breasts; three cultures from the flasks containing mixed cultures into the right breasts. The three latter all gave rise to tumours which grew progressively. Only one tumour grew as the result of the three inoculations into the left breast, and this tumour grew much slower and was approximately one-quarter of the size of the others when it became necessary to kill the chicks. This affords clear evidence that the sarcoma cells were in a more active state in the mixed cultures. The surprising fact about this experiment is that sarcoma cells should have survived under such unfavourable physiological conditions in cultures which had received no treatment for two months.

Discussion

The experiments described confirm the work of Carrel in that they demonstrate that leucocytes produce substances which stimulate the growth of fibroblasts and sarcoma cells. When fibroblasts are grown with leucocytes, growth begins sooner and continues longer. These experiments have also shown that contact between leucocytes and fibroblasts stimulates the proteolytic properties of the latter. When these two types of cells are grown together in flasks, growth and digestion of the plasma continue until the greater part of the plasma is liquefied. This goes on in flasks which are untreated for long periods. The conditions in these flasks are such that the two types of cells flourish in a sort of symbiotic relationship, in that both appear to find more favourable conditions for their growth than when cultured separately. The growth of the sarcoma cells employed has not been found to attain the same proportions in mixed cultures as do cultures of fibroblasts grown under the same conditions. This difference is probably due to the greater accumulation of toxic metabolic products, such as lactic acid, in the sarcoma cultures.

I have referred throughout to the cells growing from explants of buffy coat as leucocytes. Since the granulocytes disappear at an early stage from these cultures there remain lymphocytes, monocytes, and macrophages, which are regarded by many as different developmental phases of a common cell type. These would seem to be the cells responsible for the activity exerted by the buffy coat cultures. Older cultures of buffy coat contain a few monocytes, numerous macrophages, and some multinucleate giant cells. The non-malignant cells which migrate from explants of sarcoma are mostly monocytes and macrophages. Further investigations are required to determine whether lymphocytes, monocytes, and macrophages all alike contribute to produce the effects which have been described.

On the basis of the results of this work it seems highly probable that the monocytes and macrophages of tumours

may have an appreciable influence on their growth *in vivo*. In this connexion it is pertinent to point out that when pure cultures of malignant cells are grown side by side with cultures of normal tissues, infiltrative growth is very slow or does not occur at all. Earle (1937), in comparing the slow infiltration of fragments of muscle by the Walker rat carcinoma No. 256 *in vitro* with "the extreme rapidity of infiltration and destruction of surrounding tissues by the tumour grown *in vivo*, particularly in intramuscular injections," remarks that "there are as yet important, unanalysed factors which influence or control the infiltration of other tissues by the living tumour cell." The results of my experiments suggest that these factors may be the presence of monocytes and macrophages in the tumour *in vivo* which are absent from pure cultures growing *in vitro*. One naturally hesitates before applying results obtained from experiments *in vitro* to the explanation of processes occurring in the animal body. So far as I am aware, however, there is no record in the literature of a specific cellular reaction occurring *in vitro* which has not also been found to occur under appropriate conditions *in vivo*. One might expect, therefore, that the results of interaction between leucocytes and macrophages with malignant cells in the animal body would be of the same kind as in tissue cultures. On this assumption one might expect that leucocytes and macrophages would stimulate not only the growth of the malignant cells but also their proteolytic capacity, and thereby facilitate the infiltration of normal tissues.

Summary

The results of these experiments confirm the work of Carrel in demonstrating that cultures of leucocytes produce substances which stimulate the growth of fibroblasts and sarcoma cells.

When fibroblasts or sarcoma cells are grown together with leucocyte cultures their growth begins sooner and is ultimately more extensive than when they are grown alone. Growth stimulation occurs without actual contact between the two types of cells.

When fibroblasts or sarcoma cells are grown in contact with the cells from leucocyte cultures not only is the growth of the former stimulated but also their capacity to digest clotted plasma (proteolysis).

In mixed cultures both kinds of cells remain in a more active functional state.

On the assumption that the same cellular reactions occur in the animal body as have been described in tissue cultures, it is suggested that monocytes and macrophages by stimulating the growth and proteolytic activity of malignant cells may facilitate their invasive growth into normal tissues.

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Prolonged Coma.—According to Lester prolonged coma occurring in the course of insulin shock therapy is a complication which should be avoided whenever possible, as it is not usually followed by improvement in the patient's mental state. Such improvement as may be obtained in a few cases does not justify attempts to produce prolonged coma, as the mortality rate is too high (16 per cent. in this series).—Study of Prolonged Coma following Insulin Shock. D. Lester.—*Amer. J. Psychiat.*, March, 1939, **95**, 1083.

EFFECT OF OESTRADIOL BENZOATE ON THE AMOUNT OF GONADOTROPHIN FOUND IN THE PITUITARY GLAND AND URINE OF POST-MENOPAUSAL WOMEN

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The effect of oestrogens on the gonadotrophic activity of the pituitary gland has been studied by several methods. First, observations have been made on the gonads of the injected animal or on the gonads of another animal united to it in parabiosis (Martins, 1929; Kallas, 1930; Bunster and Meyer, 1938). These methods are not applicable to man. Secondly, the amount of gonadotrophic substance present in the urine and blood has been investigated. Frank and Salmon (1935) and Jones and MacGregor (1936) found that the gonadotrophic substance disappears from the urine of ovariectomized or post-menopausal women treated with oestrogen. Thirdly, indirect information has been obtained from the histology of the pituitary gland (Severinghaus, 1939). Fourthly, the amount of gonadotrophic hormone in the anterior pituitary gland has been estimated directly. Several workers (Meyer, Leonard, Hisaw, and Martin, 1930, 1932; Bialet-Laprida, 1933) found a diminished amount of gonadotrophic hormone in the pituitary glands of gonadectomized rats which had been treated with oestrogen. Henderson and Rowlands (1938) and Noble, Rowlands, Warwick, and Williams (1939) showed that there is an increased amount of gonadotrophic hormone in the pituitary gland of post-menopausal women. In this paper we describe the effect of the injection of large amounts of the oestrogenic substance oestradiol benzoate on the pituitary gland of similar subjects.

Methods

Administration of Oestrogen.—Four patients, whose ages ranged between 54 and 70 years, were injected intramuscularly daily with 10 mg. (100,000 I.B.U.) of oestradiol benzoate in oil solution. One patient was injected with 30 mg. daily for three days. These five patients were suffering from incurable disease, and the cause of death in the order shown in Table II was right heart failure, cirrhosis of the liver, chronic nephritis, carcinoma of the breast, and carcinoma of the cervix. At the post-mortem examination the endocrine glands appeared normal in each case. The pituitary gland was removed and the anterior lobe weighed, desiccated in acetone, and afterwards dried in a stream of hot air. Each gland was then ground to a fine powder and weighed. The pituitary glands of five other women of about the same age who had not been treated with oestrogen were used as controls.

Extraction of Urine.—Another woman, who had been ovariectomized twenty-five years previously, was injected with the same amount of oestradiol benzoate for six days. The urine of this woman was collected for three periods—namely, before, during, and ten days after the injections ceased. Crude extracts, which are referred to as CU1A,

CU1B, and CU1C, respectively, were prepared from these collections by precipitation with alcohol (Noble *et al.*, 1939). The data concerning the collections and extraction of the urine are given in Table I.

TABLE I.—*Data of Collection and Extraction of Urine of Ovariectomized Woman*

Extract (CU1)	Dates of Collections	Total Volume (litres)	Amount of Extract (gm.)	No. of c.cm. of Urine = 1 mg. of Extract
A	4/7–8/7/38	7	38.0	0.18
B	13/7–17/7/38	4	3.6	1.10
C	29/7–5/8/38	5.5	17.7	0.32

The extract CU1A was afterwards concentrated by the method of Thomsen and Pedersen-Bjergaard (1936). One milligramme of this extract (CU1A conc.) was then equivalent to 6.4 c.cm. of urine.

Biological Assay.—The dried tissue from each pituitary gland was assayed separately for gonadotrophic activity by its capacity to stimulate the ovaries of the immature hypophysectomized rat. Rats weighing 40 to 45 grammes were hypophysectomized, and ten days later, when the average weight of the ovaries had decreased from 10 to about 5 mg. (Noble *et al.*, 1939), they were injected subcutaneously with the pituitary tissue once daily for five days. For injection the tissue was dissolved in slightly alkaline water and afterwards neutralized with HCl.

The rats were killed twenty-four hours after the last injection, and the ovaries and uterus were dissected, fixed in Bouin's fluid overnight, and weighed the following day. The sella turcica of each rat was examined for the presence of anterior pituitary tissue, and any rat which was found to be incompletely hypophysectomized was discarded from the test. The ovaries and uterus were prepared for histological examination. Serial sections of all ovaries were cut and were stained in Meyer's haemalum and eosin.

The total gonadotrophic activity of each gland was expressed in terms of the equivalent amount of an extract (AP91D) prepared from a large mixed sample of human pituitary glands by the method of Wallen-Lawrence and Van Dyke (1931). For this purpose a dose–response curve was constructed for the effect of AP91D on the ovaries of hypophysectomized rats. A fivefold increase (from 5 mg. to 25 mg.) in the weight of the ovaries was produced in five days by the injection of 1 mg. of this extract.

Results

The Effect of Oestrogen on the Gonadotrophic Hormone of the Pituitary Gland.—The results given in Table II show that oestradiol benzoate in even very large doses does not cause any enlargement of the pituitary gland. The total amount of gonadotrophic hormone contained in the gland of the patients injected with the oestrogen is, however, greatly diminished. No gonadotrophic activity was demonstrable in the pituitary gland of the patient injected for fifty-four days. It has already been shown that after the menopause, in untreated patients, there is a tendency to an increased content of the follicle-stimulating hormone and a decreased content of the luteinizing hormone (Noble *et al.*, 1939). Histological examination of the ovaries of the hypophysectomized test rats failed to indicate that the treatment with oestradiol benzoate affects in any way the relative proportions of the follicle-stimulating hormone and luteinizing hormone in the human pituitary gland. The large amounts of oestradiol benzoate which were injected depress both components of the gonadotrophic complex. The general assumption that oestrogens control the relative production of these two substances by stimulating the secretion of luteinizing hormone and by inhibiting that of the follicle-stimulating hormone implies that the qualitative response of the pituitary gland should be influenced by the dosage of oestrogen.

The Effect of Oestrogen on the Gonadotrophic Hormone in the Urine of an Ovariectomized Woman.—The results of the assays given in Table III show that the extract CU1A, prepared from the urine before treatment with oestradiol benzoate was begun, contained a small amount of substance capable of stimulating the ovaries of the intact immature rat. The ovaries of the hypophysectomized rats treated with the same amount of extract, however, remained unstimulated; so it appears that the effect on the normal ovaries is brought about through the intermediation of the animal's own pituitary gland. The extracts prepared from the urine which was collected during and after the treatment with oestrogen, however, failed to stimulate the ovaries even of normal rats. These results are somewhat disappointing on

TABLE II.—*Effect of Oestradiol Benzoate on Gonadotrophic Activity of Pituitary Gland of Post-menopausal Women*

No. of Pituitary Gland (HP.)	Age (years)	Weight of Anterior Pituitary Gland		Duration of Treatment with Oestradiol Benzoate (days)	Biological Assay in Hypophysectomized Rats				
		Fresh (mg.)	Dried (mg.)		Amount of Dried Gland Injected Daily (mg.)	Weight of Organs: Ovaries (mg.)	Weight of Organs: Uterus (mg.)	Equivalent Activity in Terms of Extract (AP91D) (mg.)	Histology of Ovaries
858	64	—	60	3 (30 mg. daily)	0.4	30	73	18	F.S. and I.C.S.
1013	58	640	77	3 (10 mg. „)	0.4	26	54	19	F.S. and I.C.S.
1030	54	570	81	23 „	2.0	50	63	10	F.S. and C.L.
1029	68	730	67	45 „	2.0	12	73	2	F.S. only
907	70	—	77	54 „	2.0	4	15	0	No response
Controls 727	61	750	117	0	0.2	56	65	164	F.S. and C.L.
739	62	550	81	0	0.2	44	58	81	F.S. and C.L.
755	65	450	57	0	0.2	57	64	80	F.S. and C.L., M.G.L.
737	67	500	90	0	0.2	31	62	56	F.S. and I.C.S.
678	75	700	53	0	0.4	40	107	22	Mainly F.S., but some slight M.G.L. and I.C.S.

F.S. = follicle stimulation; M.G.L. = luteinization of the membrana granulosa; C.L. = corpora lutea; I.C.S. = stimulation of the interstitial tissue.

TABLE III.—*Assay of Extract (CU1) of Urine of Ovariectomized Woman Before (A), During (B), and After (C) Treatment with Oestradiol Benzoate*

Extract Given (CU1)	Test Animal (Immature Rat)	No. of Rats per Group	Amount of Extract Injected Daily (mg.)	Amount Given Daily in Terms of Original Urine (c.cm.)	Average Weight of: Ovaries (mg.)	Average Weight of: Uterus (mg.)	Histology of Ovaries
—	Normal	10	0	0	10	20	
A	,,	5	10	1.8	13	36	Very slight F.S.
,,	,,	5	20	3.6	20	72	F.S. and M.G.L.
A (conc.)	,,	5	2	12.8	23	68	
—	Hypophysectomized	5	0	0	5	14	
A	,,	3	20	3.6	8	13	No response
A (conc.)	,,	4	2	12.8	6	14	,, ,,
B	Normal	5	10	10.1	13	21	
,,	,,	5	20	20.2	12	24	,, ,,
C	,,	5	10	3.2	10	24	
,,	,,	5	20	6.4	11	23	,, ,,

F.S. = follicle stimulation. M.G.L. = luteinization of membrana granulosa.

account of the comparative inactivity of the extract prepared from the urine before the patient was treated, but it seems that the slight activity initially present undoubtedly disappeared as the result of treatment with oestradiol benzoate.

Discussion

The dose of oestrogen used in this investigation was that shown by Schrire and Sharpey-Schafer (1938) to diminish the excretion of urinary creatinine in acromegaly; smaller doses failed to do so. The importance of dosage is emphasized by the effect of oestrogens on urinary gonadotrophic hormone. Our results on the urine of an ovariectomized woman agree with those of Frank and Salmon (1935) and Jones and MacGregor (1936). On the other hand, Heller and Heller (1939), while clearly demonstrating the increase in urinary gonadotrophic substance that occurs either after the menopause or after castration, were unable to show any effect of injected oestrogen on the amount of gonadotrophic hormone excreted. The maximum daily dosage of oestrogen used by them was 8,000 I.U. of amniotin (Squibb) given orally or, in two cases, 10,000 I.U. injected intramuscularly. This dosage is considerably less than that used by workers who have observed a disappearance of the hormone from the urine as the result of the administration of oestrogen.

Our results show that no gross enlargement of the human pituitary gland follows the injection of large amounts of oestradiol benzoate. Although relatively enormous haemorrhagic tumours can be produced in the pituitary gland of the rat in this way, treatment has to be continued for periods of six to nine months; so it is extremely unlikely that tumours of the pituitary gland would be produced in women by even massive doses of oestrogen in the space of two months. It has, in fact, been shown by Dynes (1939) that the administration of 5 mg. of oestradiol benzoate three times a week for six weeks caused no histopathological changes in the human pituitary gland.

The simplest interpretation of our results is to suppose that, following diminished function of the gonads, the pituitary gland elaborates a greater amount of gonadotrophic hormone and that this excess activity can be inhibited by the administration of large amounts of oestrogen. However, the fact that the pituitary gland has a decreased content of gonadotrophic hormone after treatment with oestrogen does not necessarily imply that secretory activity has diminished. Indeed, it might well be increased and the gland become thereby emptied of its hormone. Severinghaus (1939) has taken the view on histological grounds that the action of oestrogens on the pituitary gland is one of stimulation and release of secretion. The disappearance of gonadotrophic hormone from the urine of patients treated with oestrogen, in the absence of evidence that the renal threshold is altered or that these substances come from elsewhere than the pituitary gland, suggests, however, that the final result is diminished pituitary activity, whether this be due to immediate inhibition of the formation of the hormone by the pituitary cells or to an exhaustion following initial stimulation.

Summary

Investigations have been made of the amount of gonadotrophin in the pituitary glands of post-menopausal women, (*a*) untreated, and (*b*) after the administration of large amounts (10 mg., or 100,000 I.B.U.) of oestradiol benzoate daily over periods lasting from three to fifty-four days.

The oestrogen causes a decrease in the content of gonadotrophic substance as assayed on the hypophysectomized rat.

It has also been shown that the presence of a small amount of a gonadotrophic substance in the urine of an ovariectomized woman was abolished by the same dose of oestradiol benzoate.

We desire to thank Dr. R. L. Noble and Mr. P. C. Williams, who prepared, injected, and killed the hypophysectomized rats, and Mrs. M. H. Warwick, who prepared the ovaries of these rats for histological examination; also Mr. S. W. Stroud, who concentrated the urinary extract CU1A, and the Chief Medical Officer of the London County Council for permission to publish results on the human material.

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CONVERGENCE DEFICIENCY

THE CONDITION, ITS OCCURRENCE IN PRIVATE PRACTICE, AND THE RESULTS OF TREATMENT*

BY

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I propose to deal briefly with certain practical clinical aspects of convergence deficiency, with special reference to a group of cases characterized by the fact that they show a divergence of 6 degrees or more (exophoria) on the Maddox wing test and failure of voluntary convergence. Such cases may with the Maddox rod show orthophoria, exophoria, or esophoria. They may be of any age from 6 to 70 years and may or may not complain of symptoms. The condition has been investigated by other observers, notably Berens, Hardy, and Stark, who, in 1929 summarized the literature and analysed over 11,000 of their own private case sheets. They came to the conclusion that "a review of the literature concerning the condition . . . revealed a wide variance of opinion regarding almost all the factors connected with it." From their own practices they arrived at the following figures:

Among 11,500 serial cases in private practice there were found 114 cases of divergence excess cross-filed	0.993%
Examining every tenth record among 10,000 serial records there were found eighteen cases of divergence excess	1.8%
The frequency, therefore, is put at..	1–2%

In my series I found a percentage of between 2 and 3. The exact figure cannot be worked out more accurately, as a number of cases were border-line with a deviation of 6 degrees and few or no symptoms. Undoubted cases formed 2.6 per cent. (167 out of 6,400), which is slightly higher than Berens's figure, but it is obvious that individual surgeons will vary slightly in what they include. I was myself always hunting for cases, and so have probably included more border-line ones than other observers. Of the 167 cases not all were treated and not all carried out the treatment. The following conclusions are therefore drawn from the eighty-two cases from among them which I have more thoroughly investigated.

We are all acquainted with the type of patient who complains of suffering constantly from "eye-strain," of being unable to engage in any close work for long at a time, and of gaining little or no help from glasses. Such patients often arrive with a sheaf of prescriptions and a handbag full of spectacles, and our hearts sink when they are produced. The majority of them show a very low-grade hypermetropic astigmatism and nothing else, other than deviation outwards on the Maddox rod and failure to perform convergence as a voluntary action. In my series there was no possible correlation with age, sex, or refraction, cases being distributed evenly over all the age periods of ten years, from 6 onwards, and the types and numbers of refractive error being those in the general population.

Seventy-one of the eighty-two cases analysed in my series were treated by orthoptic exercises, and the results were as follows:

		Treated	Cured	Improved	No Change
Symptomatic	Hypermetropes	52	37	14	1
	Myopes ..	14	8	5	1
	Anisometropes	5	3	2	—
Objective	Hypermetropes	52	31	18	3
	Myopes ..	14	6	7	1
	Anisometropes	5	3	2	—
Totals	Symptomatic ..	71	48	21	2
	Objective ..	71	40	27	4

These figures agree with those of Berens, Hardy, and Stark in that they show a high percentage of cures and improvements following treatment and also in the illuminating fact that it is possible to produce apparent alleviation of all the symptoms without providing any objective cure. This is only one more argument in favour of the already recognized fact that neurasthenia and other psychological factors account for many of the symptoms, and it brings us to the statement of the main clinical problem which I have tried to elucidate. This is, stated simply, the relation of the subjective symptoms ("eye-strain," inability to read with comfort, headache, and sometimes photophobia) to the objective signs (exophoria of more than 6 degrees on the Maddox wing and failure to perform binocular convergence as a voluntary action). That this is a definite problem is seen from the undoubted facts (1) that the objective signs can exist for years without any symptoms at all; (2) that cure of the signs does not necessarily produce disappearance of the symptoms; (3) that the symptoms may disappear entirely while the signs remain unaltered; (4) that relapse and recurrence of the symptoms may occur without reappearance of the objective signs; and, finally, (5) that cases exist with all the classical symptoms and no objectively demonstrable signs at all. Cases can be cited exemplifying these various points.

The treatment of the symptoms of eye-strain is therefore not so simple as one might imagine. It would be possible to argue from actual cases that there is no proof whatever of connexion between the signs and symptoms, and that we are dealing with entirely separate conditions that happened to coexist. However, I think we are justified in admitting some connexion in view of the high percentage of cases in the table in which alleviation of the symptoms was associated with disappearance of the signs.

Aetiological Theories

It is well known that from an evolutionary point of view increasing binocular overlap of the fields of vision appears to be correlated with increasing neopallial development in the central nervous system. This has been pointed out again and again by anatomists such as Brouwer and Elliot Smith. That the correlate of binocular overlap is neopallial increase and not increase in complexity of the eye is shown by the condition in the primitive reptile Sphenodon, which has a good macula but a primitive brain and no binocular overlap. Now, the overlap increases until stereoscopic vision becomes possible with superposition of the central areas of both fields. The final and highest form of binocular vision can therefore be considered to arise when by voluntary muscular action the animal can increase the overlap of the fields so as to obtain stereoscopic vision at the near point. This occurs so late in evolution that it is probable that only man shows it and certain that not all individuals attain it. It is also well known that some movements which are primarily largely reflex and involuntary can by practice be brought under voluntary control. Elliot Smith, Wood Jones, and other anatomists have shown that such volun-

* Abstract of a paper read to the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Aberdeen, 1939.

tary control is dependent on the existence of cerebral connexions whereby the lower centres are linked with the cortical areas controlling such movements. In most people such connexions exist, though in many they are not consciously used but can be made use of by practice.

The exact cerebral localization of function such as was envisaged by Sherrington, Horsley and Beevor, and Campbell is probably not capable of complete proof, while the work of Poljak seems to show that there is in the production of even the simplest efferent impulse a generalized activity of the whole cortex. In Gordon Holmes's valuable paper "The Cerebral Integration of the Ocular Movements" we have a most lucid account of the present state of our knowledge of the anatomical pathways involved. Beevor and Horsley's centre for eye movements in monkeys lies in the frontal lobe, separated by unexcitable cortex from the precentral gyrus. This appears to be also the case in man, though destruction, if unilateral, does not produce palsy. In addition to this centre there is another in the occipital lobe, close to but within the area striata. Fibres from here pass to the anterior corpora quadrigemina in the neighbourhood of the oculomotor nuclei. They descend medial to the optic radiations and pass through the pulvinar and anterior brachium to the tectum of the midbrain. Thus there are two cortical areas (frontal and occipital) involved in eye movements. The frontal area appears to govern voluntary movements, and if it is destroyed the patient cannot look in a certain direction to command, though he can follow a moving object, since his fixation reflex is mediated by the intact occipital centre. If the occipital centre is destroyed the fixation reflex is lost, though the patient can perform voluntary movements of the eyes. Fixation is largely reflex, but requires the intervention of consciousness. All authors from Ferrier onward have stressed the necessity for active "attention" in the acts associated with vision. Gordon Holmes says: "It is only the object which occupies attention that excites the fixation reflex." The movements of convergence are of the same nature, both conscious and reflex, and for the attainment of binocular stereoscopic vision of a near object both centres come into play. Gordon Holmes says of the frontal centre: "Through it we can by an effort of will look or turn our eyes in any direction and converge them on a near object. By it, too, we can keep our eyes directed on any object that interests us, though this is largely a function of the occipital cortex." In the cases under consideration it is likely that what we are doing or trying to do is to increase the permeability of the frontal path by "facilitation," using conscious attention as the stimulus and the fixation reflex as the source of the impulse. This is of course much older and very much more firmly established phylogenetically than the frontal side of the complete reflex.

The contraction of both internal recti together may therefore never be under voluntary control, or it may be under partial voluntary control in that it occurs in association with accommodation when called forth by the fixation reflex when the child wishes to look at a near object, or it may from a quite early age be both reflex (when looking at a near object) and purely voluntary when it is done as a trick from the frontal centre alone. This, the power of using convergence either as part of the reflex of complicated co-ordinated movements required in reading or as a purely voluntary single movement, constitutes the highest possible development of the area of cortical re-representation of the eye movements in man. A study of a series of children has seemed to show that it is normally acquired at about the age of 6 and that symptoms may be developed if it is delayed. These cases give excellent results with orthoptic treatment, and up to the age of 24 all patients in the series obtained normal voluntary and involuntary convergence. Above this age one found an increasing number of patients showing mental instability, and it is uncertain whether they are examples of delayed development also or whether they were originally orthophoric and have broken down.

Many of the psychopaths refused treatment or did not carry it out, but, apart from these, there were a large number of adults who conscientiously did the exercises and were cured both objectively and symptomatically.

Length and Nature of Treatment

The length of time needed to get the maximum result is least in the intelligent children and the young adults. In older adults, as one would expect, it is longer. The maximum time taken to produce an amplitude of fusion of 60 degrees on the synoptophore and a Maddox wing deviation of less than 6 was a year in an adult of 63, while the shortest time was twelve days in a young man very anxious to get into the Air Force. Most cases took just over a month. This does not mean many visits if the patient will work at home. About four visits are usually necessary. Practically all the cases I treated myself, as those few which I sent to orthoptic trainers took, on the average, many more visits.

The treatment employed was based on the belief that as we are trying to establish a movement which is normally dual in nature, being both part of an unconscious reflex and also capable of being performed voluntarily, two methods of approach are possible. We can increase the power and amplitude of the reflex until it becomes conscious, or we can endeavour to show the patient how to perform the voluntary action first and to relegate it to the level of a reflex again later when it has been mastered. Both methods appear to give identical results, and one may be better than the other in certain cases. The first is applicable to children and to adults without much insight. The second, to my mind, is preferable, as it is in my experience invariably shorter and more satisfying to the patient. Actually I always use a combination of the two in varying proportions. The first method includes graduated exercises in fusion on the synoptophore (Maddox and others), exercises with prisms to produce convergence for distance (kinetic treatment of Stutterheim), and exercises with a stereoscope and figures of graduated spacing and difficulty (as in the Hamblin and Wells series). All these methods increase the involuntary range of convergence.

The second method aims at stimulating the patient's appreciation of the proprioceptive impulses from the eye muscles so that he learns first to recognize the position of his eyes and thus quite soon to be able to control this. The principal procedures are the education of the patient in the appreciation of physiological diplopia and the control of this, exercises with the small diploscope, and exercises in the fusion of stereoscopic cards without a stereoscope. If retinal neglect is present the Wells G series of cards in a stereoscope is used until it disappears. The advantage in beginning with the second method is the amount of time saved. I first became interested in the whole problem as the result of some correspondence with Dr. Stutterheim of Johannesburg, the author of *Eye Strain and Convergence*. I then used his method of fusion of a distant object against prisms, base out, and also an arrangement of rotating prisms in a trial frame

which produced a somewhat similar result. The treatment sometimes took a few months; Stutterheim himself states that twenty-four visits are usually necessary, but as many as ninety may be required, though I never actually saw a patient more than fourteen times. Even this I considered far too high, and therefore attempted by education of the proprioceptive sense to shorten the treatment and to give the patient more to work on at home. I then found that if one began this way round the average number of visits was four and the time one to two months or less.

In conclusion I wish to emphasize the clinical importance of absence or weakness of voluntary convergence and to point out the fact that it is among the most easily treated of the heterophorias.

Summary

This paper is an analysis of 6,400 case sheets of private patients with reference to the frequency of the type of patient presenting exophoria at reading distance on the Maddox wing test and absence of the power of voluntary convergence. There were 2.6 per cent. of cases, and these are analysed into groups according to age, to refraction, and to type of patient.

The cerebral localization of the centres concerned in convergence is considered and the evolutionary value and meaning of the movement. Treatment and its results are dealt with. The conclusions agree in the main with those of other observers in that it can be shown that the condition is due to a developmental lag (functional, not anatomical), and that neither age nor accompanying error of refraction has any influence on its occurrence. In most individuals educative treatment of the cerebral centres and facilitation of the reflex by exercises have a marked beneficial effect.

RESULTS OF AMBULANT TREATMENT OF PEPTIC ULCERS

BY

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Lack of beds has been a great handicap in the work of voluntary hospitals, yet it has led to one considerable advance in medical treatment. Davies (1936) was obliged to treat sufferers from peptic ulcer as out-patients, and he found that healing was obtained in the great majority. The economic saving to such patients was considerable: the usual previous in-patient treatment, though probably effective in a higher proportion of cases, necessitated a long rest in bed and was a severe financial strain on many patients.

Davies was concerned primarily with the part played by nervous disturbances in the production of peptic ulcer. The hypothesis is an ancient one. Fresh supporting evidence has been supplied in the last few years. Two clinical papers by Davies and Macbeth-Wilson (1937, 1939) attempt to establish the connexion. Recent animal experiments indicate the physical channels through which the mind may affect the stomach. Hoff and Sheehan (1935) found haemorrhagic erosions and gastric ulcers following stimulation of the hypothalamus. Mettler and his co-workers (1936), after ablation of part of the cortex anterior to the pyramidal region, found petechial haemorrhages and later gastric ulcers.

It is possible to ascribe the healing of ulcers under various medical regimes solely to factors which, like rest, may exert their effects through the mind, and to deny the value of diet and alkalis. A series of controlled experiments on dogs suggests that this is untrue. Stalker and others (1937) showed that a milk diet—as opposed to the ordinary kennel diet—alkalis, and more particularly a combination of both, inhibited the development of ulcers after the giving of cinchophen. It would be inadvisable, therefore, to neglect such factors in the treatment of peptic ulcer.

Treatment in the Present Series

Forty-two patients with uncomplicated chronic gastric or duodenal ulcers have been treated since 1936 at Westminster Hospital along the lines advocated by Davies. The results are not as complete as could have been wished, owing to the outbreak of war; they are, however, satisfactory and clear-cut.

The outline of treatment is as follows. The patients went to work in the ordinary way. They were forbidden red meat, all "spices" and spicy foods, and alcohol; tobacco was restricted to a maximum of ten cigarettes a day. Six meals a day were rigorously enjoined. Alkalis were only taken when the patients experienced any pain. A mixture of magnesium carbonate and bismuth oxycarbonate was usually employed, in some cases magnesium hydroxide alone. Olive oil was never prescribed. Tincture of belladonna was ordered in about half the cases. Some of the patients were put on bromide and phenobarbitone; otherwise no systematic attempt was made to deal with mental factors: with more attention to this point results might have been better. The patients reported for some time at fortnightly intervals. They were apt to misunderstand or neglect parts of the regime; frequent consultations led to more rapid imposition of the regime and so to earlier symptomatic relief. As soon as this had been achieved they returned monthly. Radiographs were taken every three months, and strict treatment was continued for some time after the disappearance of radiological signs of an ulcer (see below): no set rule was observed in the matter. After this some relaxation was permitted. Veal, lamb, and mutton were readmitted to the diet. Alcohol was allowed in moderation and tobacco up to twenty cigarettes a day. The patients reported at three-monthly intervals. Those cases in which little or no healing was visible at the end of a year were considered failures on this line of treatment.

The original clinical diagnosis was confirmed in all cases by radiographs. "Radiological cure" was considered to have taken place when the crater and all signs of localized tenderness and spasm had completely disappeared.

Results

Of the forty-two patients two abandoned treatment and one had a perforation, for which an operation was performed successfully: no other perforation or haemorrhage occurred in the series. Of the remaining thirty-nine cases twenty-three progressed to "radiological cure," seven were failures, and in nine the data are incomplete (Table I). The ratio of cures to failures is high. Nearly all cases, whether ultimate successes or failures, lost their pain as soon as the full regime had been established.

TABLE I.—*Outline of Results*

Successes	Failures	Data Incomplete	Total
23	7	9	39

Of the nine in whom the data are incomplete six showed definite radiological improvement. In several of the

successful cases recovery was obtained after one or two radiographs had shown little or no improvement; in none of the failures had improvement been seen followed by relapse (though such can occur). It is more likely, therefore, that some of the remaining three of these nine cases will be cured than that any of the other six will relapse. Three, then, is probably the maximum of failures to be expected from this group. This brings the number of cures in the thirty-nine cases to a probable minimum of twenty-nine and of failures to a probable maximum of ten. The cures constitute approximately 75 per cent. of the total number of cases.

Table II shows the length of time from start of treatment to "radiological cure." It can be seen that the

TABLE II.—*Time taken to "Radiological Cure"*

	End of 3 Months	End of 6 Months	End of 9 Months	End of 1 Year
Cases	2	10	8	3

bulk of recoveries occurred at the end of six to nine months of treatment. Three of these twenty-three have since recurred (or possibly relapsed; see below) after three, nine, and sixteen months; in each case the trouble responded readily to treatment.

Table III shows the length of time over which the failures were followed. This table, taken in conjunction with Table II, suggests that few cures were to be expected after one year.

TABLE III.—*Length of Observation of Failures*

	Over 1 Year	Over 18 Months	Over 2 Years
Cases	2	4	1

Discussion

The gastroscope has shown that the disappearance of radiological signs of an ulcer indicates considerable but not necessarily complete healing. The same applies to negative occult blood findings. Absolute proof of complete healing is furnished only by gastroscopy. It is essential in the handling of ulcer cases that treatment should be prolonged until healing is complete. Ideally, therefore, treatment should be controlled by the gastroscope. This is not always practicable; when it is not, the strict regime should be continued for some time after "radiological cure." The proper interval needs to be determined by gastroscopic observation; three months might be taken as a working rule. It is likely that the majority of cases treated in this manner and showing definite improvement would progress to complete healing.

The rival claims of medicine and surgery in the treatment of peptic ulcers have been debated for long. One thing is certain—that adequate medical treatment can produce excellent results. Even the simple treatment outlined in this paper leads to healing of an ulcer in most cases. The rigorous bed treatment described by Hurst (1937) will probably very often succeed where the other has failed. Medical treatment unfortunately does not remove the liability to recurrence. However, Hurst finds that on an adequate post-ulcer regime recurrence is infrequent and readily responds to treatment.

Some authorities have held that reappearance of symptoms after apparent cure of an ulcer has been due to relapse of an incompletely healed ulcer rather than to the development of a new one. Such a belief was consistent with the "focal sepsis" and other hypotheses as to the origin of peptic ulcers. Nowadays the majority probably believe that recurrence is common: it is to be expected on the "neurogenic" hypothesis. The evidence in favour of recurrence has been strong, but unfortunately indirect. Direct proof has recently been provided through gastroscopic observation (Schindler and co-workers, 1938).

The need for a post-ulcer regime is a weakness of medical treatment. Such a regime is an impossibility for some on account of the nature of their work or because of their temperament. For most it is more or less of an imposition. The alternative is gastrectomy. The late results of gastro-enterostomy in chronic uncomplicated peptic ulcer have been bad and have thrown discredit on surgical methods of treatment. This is a pity, as the late results of gastrectomy are good. The danger of recurrence and the liability to dyspepsia have largely been removed. Iron is often needed, as are dietetic restrictions of some sort, but, generally speaking, these impositions are not as onerous as those of the medical post-ulcer regime. The main objection to gastrectomy is its mortality. An operation with such a mortality rate is not lightly to be urged on the common sufferers from peptic ulcers—people in the prime of life whose death profoundly affects others besides themselves. Against this risk should be set that from haemorrhage and perforation while under medical treatment. It is important that the relative magnitude of these risks should be known, as these may have an important bearing on the choice between surgical and medical treatment.

Unfortunately the statistics on this, and for that matter other, points contain many fallacies. Some of the patients dying from haematemesis have never been under medical treatment. Many of the statistics are collected over a period of five or ten years only, but since the liability to peptic ulcer is conterminous with life statistics collected over short periods are of limited value. Other figures are extracted from the work of several people, not necessarily all specialists in this field; it is doubtful if such figures are much of a guide to treatment. Apart from all this the statistics are relatively crude. For example, the mortality from perforation and haemorrhage under medical treatment may be very different in those cases which respond readily from that in the cases which are resistant. The statistics give no indication of this.

Peptic ulcer clinics have been established in several hospitals. Their constitution tends to ensure adequacy of treatment, critical analysis of results, and freshness of attack upon the many problems of this disease. Good follow-up departments should make possible the collection of satisfactory statistics. More of such clinics might be established with advantage.

Summary

Forty-two cases of peptic ulcers have been submitted to ambulant treatment. The proportion of cures has been high.

The treatment of peptic ulcers is discussed, and it is concluded that valuable results may be expected from the work of peptic ulcer clinics.

I am indebted to the honorary physicians of the hospital for kindly allowing me access to their cases and for permission to publish this paper.

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AGRANULOCYTOSIS FOLLOWING SULPHAPYRIDINE THERAPY

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The occasional occurrence of a dangerous and sometimes fatal granulocytopenia during treatment with sulphanilamide preparations is now well recognized, and many cases have been recorded. Reports of this condition occurring during the administration of the allied drug sulphapyridine (M & B 693) are perhaps still rare enough to justify this short review and case report.

Cases in the Literature

Since the publication of the first description by Johnston (1938) there have been, so far as we can ascertain, eight further recorded cases. This total does not include those occurring in young children (Dolgopol and Hobart, 1939; Hodes *et al.*, 1939) or the case mentioned but not fully described by Melton and Beck (1939). As might be expected in view of the wide application of the drug, the primary disease varies, being lobar pneumonia in two (Tzanck *et al.*, 1939; Agranat *et al.*, 1939), streptococcal septicaemia in two (Johnston, 1938; Sutherland, 1939), puerperal pyrexia in two (Briggs, 1939), thrombophlebitis during typhoid in one (Coxon and Forbes, 1938), appendix abscess in one (Barnett *et al.*, 1939), and gonococcal epididymo-orchitis in one (Nichol and Freedman, 1939).

The dosage and duration of treatment with sulphapyridine also vary widely, ranging from the 18 grammes in fifteen days of Tzanck's case, where idiosyncrasy to the drug was strongly suggested, to the 80.9 grammes in seventeen days administered by Barnett. The average dose throughout the series is 53 grammes, and the average duration fourteen days. This bears out the suggestion of Sutherland that doses of over 50 grammes are dangerous, especially to patients already suffering from a disease causing blood destruction.

Time of Onset

The exact time at which the white cell count begins to fall is often difficult to determine. In some of the recorded cases serial counts showed that an alarming fall did not occur until some days after the drug had been withdrawn. This suggests that the frequent counts advocated by so many may not give warning in time to prevent the occurrence of a dangerous granulocytopenia. Strict limitation of dosage and the realization of the possible significance of a secondary rise of temperature may be the only safeguards against this complication in the future, although even this will not eliminate the cases due to idiosyncrasy. The degree of reduction of the granulocytes was extreme in all the cases mentioned except one of those reported by Briggs. In most of them granular cells were completely absent. The lowest total leucocyte count was found in Barnett's case (75 per c.mm.), and in the majority the count was 2,000 or less. Ulceration of the fauces occurred to a marked degree in three cases only.

Treatment of Agranulocytosis

Treatment in all cases consisted in blood transfusion and administration of pentnucleotide. In some of the non-fatal cases improvement followed after a period of several days, suggesting that the treatment was effective; but in others, as in the case reported here, it seemed that the rise in the white cell count was so immediate as to appear merely coincidental. There were four fatal and five non-fatal cases in the series under review, but in Johnston's fatal case blood culture repeatedly gave a growth of *Streptococcus viridans*, and fresh vegetations were found on the tricuspid valve at necropsy, while the immediate cause of the death of Barnett's patient was haemorrhage from an incised cervical gland and from the pharynx. The remaining two fatal cases had certain exceptional features, so the prognosis in this condition is perhaps not so grave as might be imagined.

Case Report

An unmarried woman aged 54, with a good previous history, was seen by one of us (R. H. M.) on the third day of illness; she complained of general malaise, cough, and pain over the base of the left lung. The temperature was 102° F., pulse 126, and respirations 36. Signs of pneumonic consolidation involving both upper and lower lobes of the left lung were found, and a pleural rub was heard at the left base. The expectoration was blood-stained. A diagnosis of massive left lobar pneumonia was made, and treatment with sulphapyridine started, the dosage being 5 grammes daily for the first three days. The temperature fell to below normal on the fifth day of the disease (the third day of treatment), and on the sixth day the dosage was reduced to 2.5 grammes daily.

The patient's condition remained good until the end of the eighth day, when treatment with sulphapyridine was stopped, 22.5 grammes of the drug having been given in six days. On the tenth day the temperature began to rise, reaching 102° on the evening of the eleventh day. She was seen in consultation by one of us (B. P.) on the following day. Her general condition was still good, but she complained of severe pains in the legs. The temperature was 101°, pulse 110, and respirations 28. Examination revealed signs of consolidation of the left lung and a pleural rub in the left axilla at the level of the fifth rib. Apart from some oral sepsis, no cause for the secondary rise in temperature could be found, and it was decided to continue treatment with sulphapyridine (2.5 grammes daily) and to watch carefully for any sign of empyema or other complication.

On the seventeenth day of illness the general condition remained unchanged, but pyrexia continued and the patient was seen again in consultation (B. P.). The extent of the consolidation appeared less, but no signs of resolution were present. As the breath sounds were somewhat diminished at the left base paracentesis was performed; but only air was obtained, the needle having apparently entered either a small pneumothorax or the substance of the lung, though the latter would seem unlikely in view of the pneumonic condition. The dosage of sulphapyridine was now reduced to 1.5 grammes daily, and it was decided to move the patient from the country to a nursing home where radiological and bacteriological facilities would be available. For the next few days the condition appeared to be improving and the pyrexia diminished, but on the twenty-fifth day of the disease the transfer to a nursing home was made and treatment with sulphapyridine stopped. The total dosage was 46.5 grammes over a period of eighteen and a half days.

EXAMINATION

Radiological examination to exclude interlobar empyema was made by Dr. T. Garratt Hardman, with negative results, the film simply showing a basal opacity suggestive of unresolved pneumonia. Blood culture, examination of a swab from the gums, and blood counts were then carried out (G. C. D.). The culture was sterile, and the swab showed no pathogenic organisms, but the blood count revealed under 200 white cells per c.cm. (see Table), with a complete agranulo-

cytosis. There were 2,340,000 red cells per c.mm. and the haemoglobin was 45 per cent.

Table showing the White Cell Counts

Date	Total Leuco-cytes	Polymorphs. %			Baso. %	Myelo. %	Meta-myelo. %	Lymph. %	Mono. %
		Stab.	Seg.	Total					
Nov. 26	Under 200	0	0	0	0	0	0	95	5
„ 29	9,200	—	—	32	0	—	3	62	3
Dec. 2	20,000	26	22	48	1	2	5	35	9
„ 5	9,400	0	64	64	0	0	0	35	1
„ 19	11,600	0	60	60	0	0	0	38	2

It is noteworthy that it was only now, on the twenty-seventh day of the illness and two days after the drug had been withdrawn, that any ulceration of the mucous membrane of the throat or mouth developed. This took the form of three minute vesicles on the palate and a small ulcer beneath the upper lip. These lesions healed in four days. The throat remained normal in appearance throughout.

TREATMENT

A transfusion of half a pint of citrated blood was given (G. C. D.) and pentnucleotide injections were started, 30 c.cm. being given on the first day, 20 c.cm. on the next three days, and 10 c.cm. on the fifth day. The clinical improvement was dramatic. The temperature began to fall, and reached normal on the third day after the transfusion. A white cell count performed two days after the beginning of treatment gave a total of 9,200 per c.mm., with 32 per cent. polymorphs. Lymphocytes, which constituted 95 per cent. of the first count, had now fallen to 62 per cent., and metamyelocytes had made their appearance (3 per cent.). Three days later there was a further rise in the total count, to 20,000 per c.mm.—polymorphs 48 per cent., lymphocytes 35 per cent. After a further three days the count was normal, with the exception of a slight leucocytosis (9,400). The red cell count was now 2,620,000 per c.mm., and the haemoglobin 55 per cent.

The patient has made an uninterrupted recovery. Iron and liver extract are being administered for the hyperchromic type of anaemia which is present. The most recent blood count (December 19, 1939) shows the red cells to have risen to 3,470,000, and the haemoglobin to 70 per cent. A leucocytosis of 11,600 remains, with a normal differential white cell count. Poikilocytosis and anisocytosis are present to a slight degree.

The following points of interest arise in connexion with this case history: (1) the rapid recovery of the patient, in spite of the fact that the diagnosis was not made until there was a complete absence of granular cells in the blood: (2) the absence of "angina," with the exception of the slight ulcerative changes in the mouth; (3) the single symptom of persistent severe pain in the legs; and (4) the absence of any evidence of other toxic reaction to the drug.

Summary

Previously reported cases of agranulocytosis during sulphapyridine therapy are briefly reviewed.

A similar case is described in which the blood condition is attributed to the treatment of pneumonia with sulphapyridine, no other drug known to cause agranulocytosis having been administered.

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Clinical Memoranda

The Use of Dried Diphtheria Antitoxin

On a former occasion I showed that concentrated (globulin only) diphtheria antitoxin when given intravenously was followed by immediate rigors and hyperpyrexia in 23 per cent. of the cases (Peters, 1938). Whole natural antitoxin, although four times the volume of the concentrated antitoxin and containing all the foreign proteins of the horse, gave only 1.1 per cent. of similar reactions. The one disadvantage of the whole serum was the greater bulk of the injection.

By the courtesy of Messrs. Sharp and Dohme I have had the opportunity of trying a dried whole antitoxin. This is stated to be dried by rapid freezing and dehydrating under high vacuum until the moisture content is under 1 per cent. The material consists of a bulky powder which rapidly dissolves on adding 15 ml. of distilled water to the phial, which contains 50,000 units of antitoxin. This is about one-fifth of the volume of an average sample of unconcentrated natural antitoxin, but it still contains all the elements present in the whole horse serum.

The twenty cases selected for trial all had very severe attacks of diphtheria; seventeen of them had bull necks, five were second-day cases, five third-day, seven fourth-day, two fifth-day, and one a sixth-day case. During the period of this test almost all our admissions were due to a virulent intermediate strain of *Corynebacterium diphtheriae*. The antitoxin was administered intravenously, diluted with 90 to 150 ml. of 20 per cent. glucose, as is our custom in such cases. Not one of the cases had any immediate reaction, eleven had late serum rashes of moderate severity, and only two deaths occurred—one from circulatory failure on the tenth day and another from paralysis of the diaphragm in the sixth week. This is a very favourable death rate in these severe cases, being one-half that of my former but much larger series, to which I have already referred; but as the present series is small the difference is not statistically significant.

It would therefore appear that antitoxin in this form is highly suitable for intravenous injection owing to its apparent lack of rigor-producing properties and its small bulk, while its therapeutic effects are at least equal to those of any other antitoxin. A more extensive trial might show that it was better than precipitated and redissolved, globulin only, antitoxin. I note that Dr. J. C. McSweeney (1939) stated that something more potent than the existing commercial antitoxin was required in order to ensure a minimum mortality rate. Some such preparation as the one here tested may meet the case, as this rapidly cooled and dried material may undergo less alteration from its original state and would be less liable than any liquid form to deterioration on keeping. This fact is proved with many of the enzymes and toxins.

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Reviews

CANCER OF THE COLON AND RECTUM

Cancer of the Colon and Rectum. Its Diagnosis and Treatment. By Fred W. Rankin, M.A., M.D., Sc.D., F.A.C.S., and A. Stephens Graham, M.D., M.S., F.A.C.S. (Pp. 358; 135 illustrations. 30s.) London: Baillière, Tindall and Cox. 1939.

This is a book for specialists, well bound, well printed, well indexed, and well documented—too well, for it contains page after page after page of statistical tables derived chiefly from the important surgical clinics of England and the United States. They are a great tribute to the assiduity and industry of the joint authors, whose work in this branch of surgery is well known and appreciated in this country, but their ingestion and digestion make heavy claims upon the powers of concentration of the average reader.

In the section on diagnosis the authors pay high tribute to the inestimable value of *x*-ray technique in the diagnosis of growths of the colon and rectum, and especially praise the Fischer method of air distension of the bowel following a small barium enema for the demonstration of polypi and of the finer details of ulcerated surfaces. It is interesting to note that American patients delay just as long as their fellow sufferers in Britain before seeking treatment, and that in the U.S.A. "almost a year has elapsed before the average patient with cancer of the colon or rectum has an accurate diagnosis made." With regard to prognosis the authors have found Broder's classification of a greater value than the pathologists of Great Britain are yet prepared to concede to it in this field; they also pay a tribute to Dukes's work on the estimation of prognosis from a study of the spread of the disease revealed in specimens after removal. Most surgeons of experience will agree with the conclusion expressed by the authors that malignant growths of the bowel in the very young (under 30) are so highly malignant and so prone to recur after removal that radical operative measures are scarcely justifiable in this age group.

A large part of the book is taken up by a quite admirable discussion of that will-o'-the-wisp of the surgery of rectal cancer—the dream of every surgeon and every patient—the possibility of curing the disease and leaving a normally functioning anus. The answer is quite definitely in the negative: colostomy cannot be avoided—an opinion with which every British surgeon will agree. But what the future may hold in store is another question, for *x*-ray therapy is slowly consolidating a position for itself in this field, although at present it is no more than a palliative that may prolong life by a year or two. Should it be a one-stage or a two-stage operation? The answer is, of course, that no hard-and-fast rule can be laid down. All the pros and cons are here set out in utmost detail, and the Jones, the Lahey, the Gabriel, the Coffey, the Miles, the Rankin, and the Lockhart-Mummery operations are all described. But it all boils down to this: that given a surgeon with the necessary competence and experience, and given a patient who is a good surgical risk, then the Miles one-stage abdomino-perineal should be selected. If, on the other hand, the experience of the operator and the facilities at his disposal are on a lesser plane, and above all in every case in which the condition of the patient renders him less than a first-class surgical risk, a two-stage operation of the perineal type will prove much safer. Rankin himself has devised a small modification of Miles's operation whereby he makes it into a two-stage affair by doing a preliminary colostomy, dividing the bowel, closing the distal end, and dropping it back in the abdomen. The abdomino-perineal operation is then done after an interval. This means opening the abdomen twice and considerably prolongs hospitalization. It seems doubtful whether such benefits as there may be sufficiently outweigh the disadvantages.

HUTCHISON'S INDEX OF TREATMENT

An Index of Treatment. By Various Writers. Edited by Sir Robert Hutchison, Bt., M.D., LL.D., F.R.C.P. Assisted by Reginald Hilton, M.D., F.R.C.P. Twelfth edition. (Pp. 996. 42s. net.) Bristol: John Wright and Sons. 1940.

This well-known work, now in a twelfth edition, first saw the light in 1907 and has exerted its influence on more than a generation of medical practitioners. That is a long life for a medical book, especially in these times of rapid advances and changes, and can only have been made possible by constant revision. It thus challenges popular treatises in the more spacious Victorian days, such as Sir Thomas Watson's *Lectures on the Principles and Practice of Physic,* which for thirty years in the middle of last century was the chief textbook in this more extensive field. The senior editor of the *Index* has remained at his post with editorial colleagues, usually surgical, and is now assisted by Dr. Reginald Hilton. In the meanwhile Sir Robert Hutchison has found time for many diversions and, like Sir Thomas Watson, has become President of the Royal College of Physicians of London. The list of the seventy-eight contributors shows that the senior editor has written more articles than anyone else and thus set a fine example of industry, though that involved in revision of the work must be much greater. In addition to a thorough revision of the work as a whole, some articles have been entirely rewritten, such as those on anaesthesia, blood transfusion, diabetes mellitus, septicaemia, orthopaedic conditions, and tropical diseases. New articles include those on rat-bite fever, sebaceous cysts, and bone-setting. The index to the contents of this alphabetically arranged volume is of the same standard as the articles.

SURGICAL DIAGNOSIS

Surgical Diagnosis. By Stephen Power, M.S., F.R.C.S. (Pp. 228; 51 illustrations and 15 plates. 12s. 6d. net.) Bristol: John Wright and Sons. 1939.

This book is introduced to us by a quotation from *Hamlet* which appears on the fly-leaf—"I will be brief," and we may say that the author has performed no mean task in not only living up to his guiding text but at the same time producing an excellent account of his subject. He tells us in the preface that his design has been to produce a practical guide rather than a theoretical treatise. The printing, illustrations, and binding are typical of the high quality of the publications issued by the old Bristol firm responsible for it, whose productions call to mind the expression "shipshape and Bristol fashion," a compliment still paid to the integrity of the old Quaker shipowners in the West Country port. While in the main the twenty-two chapters cover the body by a regional plan—for example, there are chapters on "The Lips, Mouth, and Tongue" and "The Foot"—special subjects are given chapters to themselves—"Abdominal Pain in Childhood" and "Haematuria." The author is at his best in the chapters on genito-urinary diseases. Not all will agree with him that a goitre is "as natural an accompaniment of myxoedema as it is of Graves's disease," and in the diagnosis of thyroid swellings

the very characteristic displacement of the "carotid packet" outwards and backwards might have been mentioned. In our experience this has at times proved invaluable in recognizing the thyroid origin of a swelling in the lower part of the neck. It may be suggested also that the thyroid moves on deglutition because of Berry's ligament attaching the lateral lobe to the cricoid cartilage. Words of wisdom appear in places throughout the text—for example, regarding prognosis in spinal cord lesions, "the scene of an accident is no place for discussing its possible end results," and, in reference to Kümmell's disease, "there is considerable room for error, and error of a kind that may require explanation in a court of law."

Perhaps the author is at times rather too dogmatic, as when he says that intramedullary spinal tumours are painless and extramedullary painful; we have found the converse condition on more than one occasion. The Queckenstedt test should be mentioned in the diagnosis of spinal block, and we cannot entirely agree with his remarks on lipiodol. Fig. 18 is one of the least attractive in the book and might be better altered or omitted altogether. The reproductions of *x*-ray films are for the most part very good. Foramen magna, page 88, should be magnum, and the illustration of ventriculography on that page is misleading, since the burr holes are usually made in the supraoccipital region.

While the book fulfils the author's ambition of producing a practical guide to surgical diagnosis and is the best of its kind we have seen recently, we wonder how valuable these separate works on surgical diagnosis divorced from treatment really are. There is much to be said for the short textbook of surgery which deals with both recognition and management of everyday conditions, and on the whole we think the surgical dresser will probably prefer his larger textbook of surgery for consulting purposes and one of the small guides to surgical practice for use in the wards to works such as this which treat the diagnosis of surgical conditions rather as a thing apart.

PSYCHIATRY: THE TEACHING OF ADOLF MEYER

Psychobiology and Psychiatry: A Textbook of Normal and Abnormal Human Behaviour. By Wendell Muncie, M.D. With a foreword by Adolf Meyer, M.D., LL.D., Sc.D. (Pp. 740; 69 illustrations. 40s. net.) London: Henry Kimpton. 1939.

Professor Muncie has done a service to psychiatry by bringing before the profession an up-to-date exposition of the teaching of the Johns Hopkins School, which will always be associated with the name of Adolf Meyer. At first glance this volume, like many of the works of the author's fellow countrymen, may appear overwhelming: it is heavy, long (over 700 pages), and rather expensive, and to the British reader the use of the new nomenclature of mental diseases may be a deterrent. Still, there is much to be said for this: mental illness is essentially a reaction—ergasia—and the use of the various Greek prefixes to distinguish the clinical varieties is descriptively correct. Nevertheless, to find that the psychoneuroses are called merergasias may be rather bewildering to the beginner.

The essential of the teaching is that the patient must be considered as a whole in respect of his heredity, constitution, personality make-up, and reaction to the environment in every respect; and in the early part of the book there is an alarming synopsis of the examinations which the student should undertake to arrive at this assessment. Next is a clinical description of the various abnormal reactions, with well-chosen illustrative cases carefully recorded. Then comes a section on treatment, and finally an interesting historical bibliography compiled to show the development of thought leading up to modern conceptions of psychiatry. As might be expected, the psychoses (holergasias) come in for the fullest discussion both in respect of nosology, diagnosis, and treatment; and mental deficiency and the psychoneuroses are somewhat summarily dealt with. The paranoiac reactions obviously interest the author most and are admirably dealt with.

So far as treatment is concerned the aim is to readjust the patient to his environment, and for this purpose well-thought-out occupational therapy is looked upon as of the highest importance. Psycho-analysis is not highly regarded as a therapeutic agency, though the importance of proper rapport between patient and psychiatrist is duly stressed. Hydrotherapy for excitable patients is given its mead of praise; a useful section deals with the action of sedative and stimulant drugs; and the shock therapy for schizophrenia (parergasia) is dealt with wisely with a very tempered optimism.

It is very interesting to read this presentation of the teaching of one of the foremost schools of psychiatry. The reading is partly comforting inasmuch as it does not show any great advance on our British teaching in spite of the new terminology, but partly disturbing since it is clear that a vast amount of research is still needed in every branch of this field before we can begin to feel any complacency with regard to the service rendered by the medical profession to the mentally afflicted.

AN UNCONVENTIONAL AUTOBIOGRAPHY

All Too Human: An Unconventional Autobiography. By Owen Berkeley-Hill, Lieutenant-Colonel, Indian Medical Service (ret.). (Pp. 384. 8s. 6d. net.) London: Peter Davies. 1939.

The subtitle accurately describes this book: what the author calls, on page 22, his rebel temperament seems to have made him a misfit everywhere: at Rugby, at Oxford, and in the I.M.S. After graduating at Oxford he entered the I.M.S. in 1907, and thereby, he states on page 79, "committed the stupidest act of my life." He seems to have held several good appointments, on fair pay, had not a bad time, and thirty years later retired on a liberal pension. The I.M.S., for the best part of a century, has offered few chances of acquiring much money, and he might have done better at home. Again, he might not. Either private practice or public health work in England would probably have given ample opportunity for differences of opinion with those with whom he came in contact. His temper was hardly adapted for service in any branch of the Army. All discipline, all contact with superior authority, seem to have acted on him like a red rag to a bull. In spite of, perhaps because of, these idiosyncrasies the book is interesting and readable; though some will think his constant references to topics of sex, which he seems to have found the most interesting branch of psychiatry—his favourite study—hardly suitable in a book intended for the general reader.

The war of 1914–18 took over four years of the author's life, as it did for most men of his generation. This period he put in in the East African campaigns, his account of which fills a long and interesting chapter. Like all engaged there, he underwent many hardships. But he does not appear to have been wounded or to have suffered materially in health. After the war he was posted to the European mental hospital near Ranchi, a pleasant station with a good climate. The hospital had just been built—the buildings were scarcely finished. So much had been spent on building that no money was left for equipment.

His first few years at Ranchi were spent in constant endeavours to get the necessary equipment, and constant struggles and quarrels with all authorities—quarrels which he seems to have thoroughly enjoyed. At Ranchi he spent fifteen years—half his service. He found chaos, and left it the best mental hospital in Asia. So he has, mainly by his own energy and force of will, carried to completion a good piece of work for India and its people. Few of us can say so much.

YEARBOOK OF RADIOLOGY

The 1939 Year Book of Radiology. Diagnosis: Edited by Charles A. Waters, M.D.; Associate Editor, Whitmer B. Firor, M.D. *Therapeutics:* Edited by Ira I. Kaplan, B.Sc., M.D. (Pp. 528; 510 figures. 4.50 dollars in the United States; English price 19s., postage 7d. extra.) Chicago: Year Book Publishers, Inc.; London: H. K. Lewis and Co.

The 1939 edition will find as warm a welcome from its readers as did the previous issues of this most useful annual survey of radiological literature. It maintains the high standard set up by its predecessors, and is to be recommended to all interested in radiology. The diagnostic section occupies the first 286 pages and contains 431 illustrations; the remaining 229 pages, with seventy-nine illustrations, are devoted to radiotherapy.

Although the editors, Drs. C. A. Waters and W. B. Firor, have no revolutionary advances to report, the diagnostic section contains much of interest. In osteology articles on spontaneous osteolysis, oedema of the hands from narrowed intervertebral foramina, silent infractions from repeated mild trauma, and a paper by Schinz on metabolic bone disorders attract attention, as do petrositis and yet another method of localization in the eye in the skull section. Iodine hepato-splenography avoids the dangers of thorium and is worthy of an extended trial. The medium, an ester or alcohol of tri-iodo-stearic acid, appears to give satisfactory shadows and is rapidly excreted. Other articles of outstanding interest are those on transient pulmonary consolidation and atelectasis, calcification of the gastric wall, and congenital ileal atresia with microcolon. Pride of place should perhaps be given to the work on cardio-angiography in children, using uroselectan B, which may prove of considerable value in studying congenital heart lesions. The demonstration of foetal respiratory movements by amniography is of physiological interest, while the description of Janker's technique for miniature chest radiography is of particular value at the present time.

As Dr. I. I. Kaplan, the radiotherapy editor, notes, no remarkable discoveries have taken place either in radiotherapy or in the aetiology of malignant disease. The work on dextrorotatory glutamic acid in cancer is described, and attention is paid to both supervoltage and low-voltage contact therapy. The bulk of the section deals with radiotherapy of individual diseases.

Notes on Books

A timely pocket-book, *Field Service Notes for Regimental Officers,* has come from the indefatigable pen of Colonel E. M. COWELL, and is published by J. and A. Churchill Ltd. at 3s. 6d. Sir W. H. Horrocks, who commends the work in a foreword, recalls that the author has been associated with the Army for nearly thirty years, and his varied medical experience has taught him what a young civilian should know as soon as possible after he has been commissioned. "With this small book in his possession it is certain that a young officer will be able to deal confidently with the new problems he will probably meet early in his Army life." In agreeing with this opinion we feel sure that officers of the new Army will derive much benefit and interest from the clear-cut guidance on preservation of health in billets, camps, and at outposts, and on kindred matters, compiled by Colonel Cowell from existing Service books. It includes chapters specially written for medical officers.

First aid should be added to the three R's as an essential of elementary education. With its knowledge countless lives have been saved without it as many have been sacrificed to ignorance. In *Illustrations of Bandaging and First Aid* (Livingstone, 6s.) Miss LOIS OAKES has produced an attractive little volume illustrating first-aid methods with the introduction of a minimum amount of description in the text. The volume is of convenient size and the print and illustrations are clear. Fractures of the thoracic spine should be handled in the prone position, however, and not as described on page 226, and this section could with advantage be enlarged. It should be emphasized that a patient who is lying semi-prone with a fracture in the thoracic part of the spinal column should on no account be turned on his back lest irreparable damage to the cord ensue. Perhaps the chief value of this little book is as a guide to bandaging, and as such it should prove popular.

The forty-seventh edition of the *Annual Charities Register and Digest* for 1940 has been published at the usual time by the Charity Organization Society. Copies can be obtained from the C.O.S., Denison House, Vauxhall Bridge Road, London, S.W., or from Messrs. Longmans, Green and Co. (price 8s. 6d.). War-time conditions have reduced the number of pages, and the index is now less comprehensive. In other respects there is not much change to be noted in the material or its arrangement. The C.O.S. does valuable work in war as in peace, and not the least of its services is the production of this classified list of charities and public institutions, with a statistical chapter on the finance of the social services.

A copy of the Collected Papers from the Middlesex Hospital Medical School published during 1938–9 has been received from the Cancer and General Research Committee of the hospital, and can be consulted in the Library of the British Medical Association.

Preparations and Appliances

A SIMPLE BLOOD TRANSFUSION OUTFIT

Mr. H. S. SHUCKSMITH, F.R.C.S., surgical tutor, University of Leeds, writes:

This apparatus, as employed by the Leeds Blood Transfusion Service for the use of stored blood, was developed in the early part of 1939. It fulfils rigid bacteriological tests and no assistance is required in its use. It is easily maintained and is not costly.

Donor's Outfit.—The storage of 450 c.cm. of blood with the use of I.H.T. solution as the anticoagulant requires a container of 900 c.cm. capacity, and for this purpose a wide-necked cylindrical glass bottle was selected. The stopper is a thick rubber bung, which is firmly gripped by the bottle neck, carrying two short pieces of glass tubing five-thirty-seconds of an inch internal diameter. A modified Higginson's syringe is attached to one of these tubes, while the other is connected by two feet of moderately thick rubber tubing of five-thirty-seconds of an inch internal diameter to a Dean's needle No. 13 gauge by 1½ inches long. A bakelite screw cap, fitted with a thick pure rubber washer, is provided for sealing the bottle after collection, and during storage an additional cover of lint is tied over the bakelite cap. Sample tubes for serum are attached to the container by a rubber band. (See Fig. 1.)

Recipient's Outfit.—A second stout rubber bung carrying a long glass air inlet tube and a short funnel-ended delivery

tube is substituted. The inner funnel-ended delivery tube is fitted with a piece of fine mesh cotton gauze to act as a filter, and a glass drip and cannula or needle are connected to its outer end with rubber tubing. A detachable wire cage fitted to the container enables it to be suspended in an inverted position during an infusion, while the rubber bung can be tied with tape to ensure that the contents of the container will not be spilled. (See Fig. 2.)

Sterilization.—Bacteriological cleanliness is not sufficient, and care must be taken that all macroscopic and poisonous substances (pyrogens) from the rubber are removed. All new rubber parts require preliminary treatment with sodium carbonate solution (1 oz. to 1 pint), followed by autoclaving in a high-pressure sterilizer for half an hour. The parts are then washed clean and finally rinsed in freshly distilled water. Rubber may be cleaned after use by washing in lotio saponis and then being thoroughly rinsed in distilled water. Transparent tubing is an advantage in that inadequate cleansing is less likely to pass unnoticed. Bacteriological sterility is achieved by autoclaving the fully assembled donor outfit enclosed in a lint cover with the needle point protected by a piece of pressure tubing. It should be autoclaved at 15 lb. pressure for fifteen minutes. The recipient outfit is similarly sterilized, and kept separate in readiness for fitting to the container when infusion is to be carried out.

If care be taken in both cleaning and sterilizing, this simple outfit allows of blood being taken and stored easily and efficiently. Dr. Gordon has kindly tested the sterility of the stored blood in a consecutive series of twenty-four samples and reported no contamination at periods varying from seven to twenty-one days after withdrawal. Great importance is attached to the use of tincture of iodine in the preparation of the donor's skin.

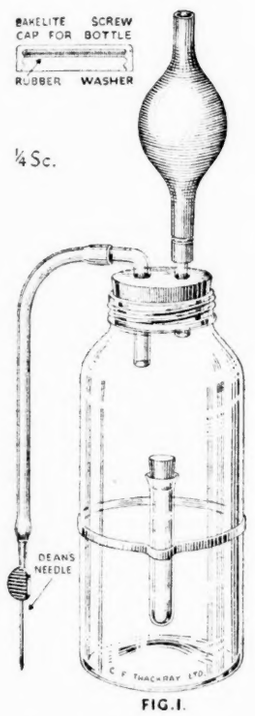


FIG. 1.—Donor's outfit.

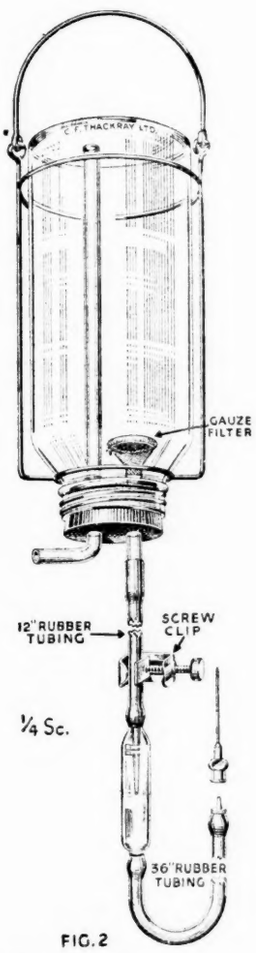


FIG. 2.—Recipient's outfit.

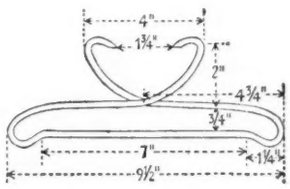
This outfit has been made in the first place for use in the Leeds General Infirmary, and secondly for the transfusion centre of the Leeds Blood Transfusion Service, by Messrs. Thackray and Sons, Ltd., Leeds.

BOOT CLIP FOR EXTENSION OF LEG IN THOMAS LEG SPLINT

Lieutenant-Colonel D. C. MONRO, R.A.M.C., assistant professor of military surgery, Royal Army Medical College, writes:

When using the Thomas leg splint in first-aid work the injured limb must be steadied in the splint by a combination of fixation and extension. A certain degree of fixation can always be obtained by a simple padding and bandaging, but sufficient extension is the key to the value of this splint.

In certain circumstances extension cannot be applied as first aid, but must wait till the patient reaches a main dressing station or C.C.S.—for example, when, in addition to a compound fracture of the thigh or leg, the foot or ankle is damaged, or where contamination of the boot by mustard gas necessitates its early removal for the urgent treatment of the local skin. On the other hand, in all cases where the boot may be left on the foot, one of the two methods described in the *R.A.M.C. Training Manual* (para. 627 et seq.) or first-aid manuals is available. In the first method a skewer is made to pierce the waist of the boot, slightly obliquely, just in front of the heel. The skewer passes between the sole of the foot and the sole of the boot. Although this skewer has a sharp or gimlet point, it often requires considerable force to insert, and may well produce painful rotation movements at the fracture. In the second method a simple clove-hitch of bandage applied over the foot takes the extension strain. In both these methods, and in the modification to be described, the extending force is exerted indirectly to the limb, through the boot. Provided the boot is a normal fit and properly laced, the strain, which is merely a temporary steadying one, will cause no serious pain or pressure damage to the dorsum of the foot.



In the *British Medical Journal* of May 13, 1939 (p. 1014), Dr. Lionel J. Picton described and illustrated a boot clip to replace other methods, and was kind enough to send one of his pattern to Millbank. His clip is simple and can be quickly slipped on to the boot. It has the advantage that it requires no force to apply, and does no damage whatever to the boot. On the other hand, it does not prevent rotation movements of the leg. With the object of eliminating this defect the modification here illustrated was devised. The spring is obtained in a similar manner by using mild steel; but the lateral extensions of the clip rest firmly on the bars of the splint, and in so doing hold the foot dorsiflexed and comfortably steady, *without* the addition of a foot-piece. The "Millbank clip" is made of one piece of metal, has sufficient spring to permit the jaws opening to grip the sole, and when the extension tape is applied to the lateral arms the bite is secured in proportion to the extending force, and the boot upper remains undamaged.

It is hardly necessary to insist that all credit for the inception of this type of clip belongs to Dr. Picton.

MULTIVITAMIN CAPSULES

"A B D capsules" (Allen and Hanburys Ltd.) are a multivitamin preparation. Each capsule contains: vitamin A, 2,000 international units; vitamin D, 200 international units; vitamin B_1, 100 international units; vitamin B_2, equivalent of 0.1 gramme riboflavin. They also contain other factors of the vitamin B_2 complex—namely, nicotinic acid and the filtrate factor. Thus they provide adequate quantities of the most important vitamins. The gelatin capsules are small and easily swallowed.

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THE RED CROSS PREPARES

In the present year the British Red Cross Society completes its seventh decade. Great Britain was late in adopting the recommendation of the International Conference at Geneva in 1863 that national committees or societies for the aid of the wounded in war be formed in the countries which participated in that conference. Within little more than a year such societies had been formed in France, Italy, Belgium, and three German States, but it was not until the outbreak of hostilities between France and Prussia in 1870 that the British organization came into existence. Its first act was to send to the Continent forty medical men, who were divided equally between the French and German armies. An Englishwoman, however, may be regarded as the inspirer of the Red Cross movement, for Henri Dunant confessed that it was Florence Nightingale's work in the Crimea which led him in 1859 to visit the battlefield of Solferino on the plain of Lombardy, where, in fifteen hours of a summer day, nearly 40,000 Austrians, French, and Sardinians had fallen. His booklet, *Un Souvenir de Solferino,* urging the formation of voluntary societies to succour the wounded, may be said to have started the movement. Almost every country now has its Red Cross (or Red Crescent) organization, and the eager devotion which the emblem has enlisted is an impressive answer to the cynic who despairs of human society. The Red Cross movement is one of those things which everybody takes for granted but few take the trouble to understand. The limitations under which it works are often not appreciated. Unlike the army medical services, of which it is so valuable a supplement, it is an entirely voluntary organization; unlike them again, it has nothing to do with the combatant. It cannot comfort and sustain the soldier, save in the knowledge it affords that its help is available should he fall. Its ministry begins only when the soldier is out of the ranks, when he is wounded or sick or captive, no longer the foe of anyone, but, on the contrary, an object of solicitude irrespective of the side on which he has been fighting. One example of how the Red Cross can pass the frontiers was afforded in 1918, the fourth year of the last war, when, on the invitation of the German Government, British Red Cross commissioners went to Germany to arrange for the alleviation of the distress then existing among some 45,000 Russian prisoners of war in that country.

The first half-year of the present war is in strange contrast to the corresponding period of the war of twenty-five years ago, and the difference affects Red Cross activities like much else. Casualties, except at sea, have been mercifully few, the civilian population in this country has been spared the expected onslaught from the air, and the Red Cross, like the Emergency Medical Organization, has had to exercise the fortitude of patience in relative inactivity. It was very different in 1914. Before August was out the Red Cross ambulance columns were meeting the hospital trains at Waterloo. A Red Cross unit of ten surgeons, ten dressers, and twenty trained nurses had been sent to Brussels and was in that city when it was entered by the German army. Following the retreat from Mons Red Cross ambulances were at work for three weeks searching for the wounded. Within two months of the outbreak more than a dozen surgical units had proceeded to France. A unit of voluntary aid members, reaching Boulogne in October, found themselves within twenty-four hours of arrival feeding a thousand wounded and readjusting their dressings. In this country, in the Red Cross hospital at Netley, 450 wounded men were receiving treatment by Christmas. In one county alone—East Lancashire—nearly fifty auxiliary hospitals had been established by the end of 1914 and were filled with patients transferred from military hospitals. To recall these facts is to illustrate the difference between the former and the present war. But those who are directing the Red Cross movement know well that, delayed though the call may be, when it comes it will be urgent and extensive, and accordingly the preparations have been on an unexampled scale. In 1914 it was not until after the war had started that the British Red Cross Society and the Order of St. John of Jerusalem decided to pool their resources and enter upon a working agreement with a view to economy and efficiency for as long as the war lasted. On this occasion a joint emergency committee of the two bodies was formed five months before war broke out, and this was later replaced by a legally constituted Red Cross and St. John War Organization, with Lord Cromer as chairman. Fifteen departments have been created—medical, nursing, stores, transport, and so forth—each under a head specially selected for technical qualifications. Advisory committees have been set up with representatives of the War Office and Foreign Office, and working arrangements made with the Ministries of Health and Supply. A Red Cross commissioner, Lieutenant-General Sir Sidney Clive, has been appointed to France. Every kind of equipment is assembled for field and hospital service. A sum of £100,000 has been spent or allocated for the purchase of hospital supplies. Surgical, nursing, and ambulance personnel have been trained and rehearsed in their duties. Lord Horder is chairman of a committee charged with the inspection of large houses which, now as in the last war, have been offered as auxiliary and convalescent hospitals, and accommodation, equipment, and personnel are being provided as required. Over 3,000 V.A.D. women members have gone into Navy, Army, and Air Force hospitals, and 1,400 V.A.D. men have enlisted in the R.A.M.C. and the medical service of the R.A.F.

Apart from medical, hospital, and ambulance provision there remains the great organization of the Red Cross for the dispatch of food and clothing to prisoners of war, for search for the missing, and for arranging visits by relatives of seriously wounded men in field hospitals and elsewhere. All this has again been constituted. The Lord Mayor of London's Red Cross Fund stands at about one million pounds. The calls upon it up to now have been relatively small, but should the expected demand come that million would disappear like snow in the spring thaw. It is estimated, on the basis of the last war, and supposing the present one to last for the three years envisaged by the Government, that the organization will require not one million but ten. On the work for prisoners of war only some £10,000 has so far been expended, but in the last war this service alone absorbed five millions. And, as though the war in the west were not enough, there have been two "side shows," to use the flippant phrase of the last war—one the help which the British Red Cross, more especially through its Scottish branch, has given to Finland in the provision of ambulances and medical supplies, and the other an allocation to the Turkish Red Crescent for the relief of distress occasioned by the recent earthquakes and floods.

In one particular the Red Cross occupies a different position in this war from that which it occupied in the last. This relates to the voluntary aid detachments, which were first formed thirty years ago to supplement the medical organization of the Territorial Force on home service. Until some time after the war of 1914 had started those who bore the Red Cross brassard over-seas were fully trained persons—doctors, nurses, and dressers—but very soon voluntary aid detachments were sent to France, and presently were at work in almost every country in which British troops were engaged. After the war, when the Territorial Army replaced the Territorial Force, and liability to foreign service took the place of home defence, the future of the voluntary aid detachments, as a technical reserve, became a matter of concern to the Army Council as well as to the Red Cross Society, and the council proposed that detachments should in future be liable to be called upon to assist the medical services not only of the Territorial but of the Regular Navy and Army and Air Force. A body was set up on which the Services and the Red Cross and St. John organizations were represented, and in 1923 an official scheme was issued, followed by regulations designed to ensure the enrolment of an educated personnel accepting definite obligations. The British Red Cross Society, while still making its first object the raising of voluntary aid detachments complying with the official scheme, also set up what were known as British Red Cross detachments to include persons undergoing preliminary instruction or unable at the moment to assume liability for service under the Government, these to form a means of replenishment of voluntary aid detachments proper. The term "V.A.D." was sometimes disparaged in the last war by those who knew little of the devoted service which these women, and men too, were giving. Any such disparagement, if it should ever be made, will have even less justification now.

THE ANATOMY OF PERNICIOUS ANAEMIA

Meulengracht's[1] work on the relative therapeutic efficacy of different preparations of desiccated stomach showed that the pig's stomach, both histologically and functionally, is divided into two distinct parts: a fundus portion or body, containing fundus glands with parietal and chief cells secreting hydrochloric acid and pepsin; and a pyloric portion, containing pyloric glands with the large clear pyloric gland cells secreting the anti-anaemic factor. Brunner's glands in the duodenum are believed to have the same anti-anaemic function as the pyloric glands of the stomach. It has been known for many years that achlorhydria was an essential feature of pernicious anaemia, and it was natural to expect that the stomach would show gastritic or atrophic changes involving both the body and the antrum. Haematologists were therefore surprised when Magnus and Ungley[2] and Meulengracht[3] independently reported that, whereas the body of the stomach in pernicious anaemia invariably shows atrophic or gastritic changes with disappearance of the parietal and chief cells, the pyloric glands are relatively well preserved and Brunner's glands appear absolutely normal. Meulengracht believes that the apparent contradiction between the morbid physiology and anatomy of the stomach in pernicious anaemia can only be explained on the grounds of a disturbance in function. Possibly a hormone is absent which normally stimulates secretion from the pyloric organ, in the same way as the secretion of the duodenal wall starts and maintains the pancreatic secretion. We are faced with the same problem in those cases of diabetes mellitus in which the pancreas shows no departure from the normal. It is noteworthy that the lesion in the body of the stomach in pernicious anaemia is itself most commonly a diffuse non-inflammatory atrophy which might well be due to a nutritional or endocrine deficiency. These doubts and difficulties about the pathogenesis of pernicious anaemia have not prevented people from suggesting that polycythaemia vera is due to overactivity of the pylorus organ and treating it by irradiation of this portion of the stomach.[4] As other tissues, including the ribs, vertebrae, and circulating blood, are exposed at the same time, this therapeutic test cannot be considered very crucial.

Uotila[5] and others have claimed successes in treating pernicious anaemia with desiccated intestine, and this makes it even more difficult to hold the simple gastrogenous theory of pernicious anaemia, though it is conceivable that the intestine might absorb effective substance secreted higher up. Jacobson[6] points out that the anti-anaemic activity of the alimentary canal corresponds very closely with the distribution of the argentaffine cells. These are cells containing granules which stain black with silver solution and also have the unusual property of fluorescence in ultra-violet light. They are found in the intestinal canal of all mammals so far investigated. In man they occur in the cardiac

[1] *Acta med. scand.*, 1934, **82**, 352.
[2] *Lancet*, 1938, **2**, 420.
[3] *Amer. J. med. Sci.*, 1939, **197**, 201.
[4] *Acta med. scand.*, 1938, **97**, 547.
[5] Ibid., 1938, **95**, 415.
[6] *J. Path. Bact.*, 1939, **49**, 1.

region of the stomach, are practically absent in the fundus, and are always found in fair numbers in the pyloric region. They are most numerous in the duodenum, especially the first part, and occur, though less abundantly, in the mucosa of the jejunum, ileum, colon, and appendix. A similar distribution is found in the pig. The carcinoid tumours of the appendix and small intestine arise from these cells. Moreover, Jacobson found that in twelve cases of pernicious anaemia and in two cases of sprue argentaffine cells were almost completely absent, whereas they were little if at all altered in other forms of anaemia. Histochemical tests forged yet another link between pernicious anaemia and argentaffine cells, for they showed that the granules contained a complex purine (pterine), and a similar substance has been demonstrated in liver extract.

It is impossible to review this work on pernicious anaemia without feeling we are on the verge of far-reaching discoveries in alimentary physiology. One is constantly reminded of the likeness to diabetes mellitus and the overriding mechanisms which Houssay discovered in the hypophysis. But the difficulties in the way of research on pernicious anaemia are enormous. There is no test animal except man for the anti-anaemic factor—no Allan dog or Houssay toad. The disease is rare, and histological studies are impossible unless the tissues have been fixed by injection of formalin shortly after death—a procedure often strongly opposed by nurses and coroners. It would be well for the one or two who are working on the morbid anatomy of pernicious anaemia to make their needs known to as wide a circle as possible, so that none of the available material should be wasted.

MARGARINE

The recent announcement that from February 5 all margarine other than that sold for manufacturing purposes will incorporate vitamins A and D in the same quantity as in butter will set at rest the minds of those medical men who were rightly concerned about the advice they should give to their patients, who in these days are as familiar with the word "vitamin" as with the word "complex." Nevertheless it should be borne in mind, as Professor Drummond points out in his recent article in *Nature*,[1] that the average person is for vitamins A and D more dependent on such things as milk, eggs, and green vegetables than on butter and vitaminized margarine. Taking 1938 as a year in which butter was on the whole cheap, he estimates roughly that the consumption of butter and margarine in this country was then ten ounces a week, and on the assumption that the whole supply had the same vitamin content as an "average" butter he calculates that this supplied per head per week 5,500 units of A and 150 units of D. But these quantities, he remarks, are nearer to the requirements for one day than for one week. This is not to decry the value of the butter and margarine as sources of vitamins A and D, as the other foodstuffs supplying these in adequate quantity are not cheap, and the poorer classes, therefore, for economic reasons run the risk of vitamin deficiency. Up to the beginning of this month "an average vitaminized product can be taken at 450 units of A and 30 units of D per ounce." Margarine was invented by a French chemist, Mège-Mouries, who actually tried to produce butter itself in the laboratory by measures thought to reproduce exactly the changes by which he conceived body fat was converted into milk fat in the animal. Few agreed with him that he had succeeded, but his achievement in making a substitute for butter was recognized in the year of the Franco-Prussian War by Napoleon III. After this the manufacture of "butterine," as it then came to be known, was carried on in the U.S.A. and in Holland, and Mège-Mouries's complicated method was abandoned for the simpler one of mixing sour skimmed milk with a fat of appropriate melting point. The "butterine" manufactured in this country was most of it "made in small, dirty, back-street premises under highly insanitary conditions." The first up-to-date factory in Great Britain was opened in 1889 by Otto Monsted. Monsted used that part of beef fat which is known as "oleo" or "*premier jus*." The next step was the introduction of vegetable oils for blending with oleo, but it was some time before the difficult problem of producing a texture resembling that of dairy butter was solved. Big commercial organizations devoted large sums of money to scientific and technical research on such problems as the choice of the right oils for blending, methods of emulsifying the mixture with pre-treated separated milk, the selection of the appropriate bacterial flora to produce in the separated milk "just the right blends of substances necessary to impart to the margarine that elusive 'butter flavour.'" During the latter part of the war of 1914–18 the importance of the fat-soluble vitamins came to be generally recognized, but these were absent from margarine, which was then mostly being made from vegetable oils and fats. It was not until about six years ago that a satisfactory vitaminized margarine was put on the market. The discovery of the preparation of pure crystalline vitamin D_2 from ergosterol had made it possible to raise the anti-rachitic value of a margarine at only a slight cost. The addition of one ounce of vitamin D_2 (calciferol) to 120 tons of margarine conferred on it a vitamin D activity of 30 units per ounce. The search for a cheap and effective source of vitamin A led to the use of whale-liver fat. Margarine, like butter, must not contain more than 16 per cent. of water. The respective calorie values of butter and margarine were given in the Report of the B.M.A. Committee on Nutrition as 3,503 and 3,579 per pound. One last thing about margarine—and that is its pronunciation; the Oxford English Dictionary gives the "g" as hard, and there seems to be no good reason for making it soft. The term came from margaric acid, erroneously thought in the 'seventies to be one of the fatty acids in animal fat. "Margarine," then, was the fat that contained margaric acid, just as stearine is the name given to the fat containing stearic acid. It was subsequently found that the so-called margaric acid was a mixture of stearic and palmitic acids.

[1] January 13, 1940, **145**, 53.

EXPERIMENTAL INDUCTION OF GLIOMATA

It has well been said that 1775, 1915, and 1930 are three of the greatest landmarks in experimental cancer research; but for Pott's observations as to the relation between chimney sweeping and scrotal cancer Yamagiwa and Ichikawa would never have applied their Oriental patience to the painting of mice with tar, and had their persistence not been rewarded Kennaway and his co-workers would not have achieved by a magnificent example of team work the production of a synthetic oncogenic substance. In

the nine years since this discovery the possibilities and complexities of the subject have widened to a remarkable degree, but one of the technical tricks which has been used to great advantage has been the implantation into the tissues of pellets either of the actual oncogenic chemical or of a solution of it in cholesterol. By this means it is possible both to observe the immediate and remote tissue reactions to the substance and also by chemical analysis to determine the degree of absorption of the substance and any change that may take place in the pellets. This method has enabled Seligman and Shear[1] to produce gliomata in 55 per cent. of a small series of mice, and is the more significant as it has not been possible previously to induce brain tumours in animals. Numerous attempts have been made but all have been unsuccessful, and at the best a granulomatous hyperplasia has been achieved; it is true that Vásquez-López[2] produced tumours in fowls by the injection of Rous filtrate, but these were not gliomata. In Seligman and Shear's experiments mice of the "C_3H" strain were used (the spontaneous incidence of tumours in this strain is not known, but it is undoubtedly very low, for Slye and her co-workers found only three brain tumours in 11,000 animals), and a pellet of pure methylcholanthrene weighing approximately 1.5 mg. was implanted into the cerebral cortices of twenty animals. Of these animals thirteen developed intracranial tumours, which were discovered at periods varying from 227 to 511 days after the implantation; three showed no evidence of tumour after 522 days; and the other four died or were killed at shorter intervals without any cranial lesion being found. Two of the thirteen tumours were fibrosarcomata, probably meningeal in origin, but the other eleven clearly corresponded to human gliomata. In a supplement to the paper Alexander analyses them and suggests that three were spongioblastomata polare, two glioblastomata multiforme, two neuro-epitheliomata, and the other four were examples of fibrillary astrocytoma, pinealoma, oligodendroglioma, and ependymoma, respectively; from the illustrations one would in the main agree with this classification, though the pinealoma and neuro-epitheliomata do not appear to be typical. One of the fibrosarcomata was successfully transplanted and also the extracranial portion of a tumour classified as a neuro-epithelioma—though the illustrations suggest that it also was a fibrosarcoma of poorly differentiated type—which had perforated the skull; the cerebral portion of the growth could not be transplanted, but the extracranial portion was propagated through five generations by axillary implants. In a footnote the authors state that Peers had informed them that he had also been able to induce gliomata in mice using a somewhat similar technique. The possibilities that this work has opened up are considerable, but one of the most obvious from the point of view of morphological pathology is an analysis of the early changes in the brain, which should do something to clarify the question of "dedifferentiation," which is still upheld by neuropathologists though it has been abandoned to a large extent by general oncologists in favour of the view that all tumours are derived from relatively undifferentiated cells with potentialities for orthodox or heterodox differentiation to a greater or less extent. Another point which is noted by Alexander is the absence of tumours in this series corresponding to the medulloblastoma, and it may be possible, if the results of Seligman and Shear can be readily duplicated, to determine by means of implantation of pellets in the cerebellum and elsewhere whether these tumours are distinct entities possibly derived from the granular layer of Obersteiner or are all neuroblastomata, as Hortega would have it.

[1] *Amer. J. Cancer*, 1939, **37**, 364.
[2] Ibid., 1936, **26**, 29.

SEX HORMONES IN ACNE

During recent years dermatological opinion has gradually tended to the conclusion that there is a definite relation between acne and sexual development. Acne is certainly a disease of adolescence, and has occasionally been associated clinically with anomalies of the endocrines controlling sex. Bloch has shown in a study of over 4,000 school children that there is a close relation between the appearance of this skin disorder and the physical evidences of sexual maturation. It is also well known that in women it waxes and wanes with various phases of the menstrual cycle, and there are countless instances of acne being associated with some form of menstrual disorder. During recent years the development of quantitative methods of estimating the output of sexual hormones has made it possible to investigate this subject experimentally. Several teams of workers, mainly in America, have employed themselves on the subject. Perhaps the most interesting research has been undertaken by Professor Wile, with the help of his assistants Barney, Bradbury, and Snow.[1] They ascertained the amount of urinary extract necessary to produce cornification of the vaginal mucosa in young albino rats that had undergone bilateral oophorectomy, and they were thus able to estimate the oestrogen content of the original specimen of urine. In estimating the androgen content they ascertained the capon units by injecting the extract into caponized Leghorn cockerels. Employing this extremely laborious method they determined both the oestrogenic and androgenic output in a series of twenty cases of acne in both sexes, and in a series of control cases also. They found that in both sexes there was a decrease in the output of oestrogen and an increase in the output of androgen. Moreover, the ratio of excretion of androgen to that of oestrogen was observed to be almost twice as great as the normal ratio in both sexes. This increase in excretion of androgen seems to indicate that there is no real justification for the use of androgenic substance in the treatment of acne vulgaris, and Wile is of opinion that, although the diminished excretion of oestrogen in many cases of acne might suggest its therapeutic employment, there is not yet sufficient proof of the aetiological significance of this diminution to justify its general therapeutic use. On the whole the experience of other workers who have used sex hormones empirically in the treatment of acne is parallel with Wile's deductions. It is true that Riley[2] reports a moderate degree of improvement in twenty patients with acne given testosterone propionate over a period of three months, but he also states that the results are not such as to encourage the substitution of this for simple routine measures; incidentally it may be remarked that Wile's experiments suggest that the administration of testosterone propionate would be likely to do more harm than good. In a discussion on the subject at the American Dermatological Association Dr. Templeton said that in one series of twenty-five cases he had tried the effect of antuitrin S, which is a gonadotrophic substance, and in another series he had used amniotin (an oestrogenic body), in each case over a period of three months, but that he had been extremely disappointed with the results. It therefore appears that we have yet to find a practical method of utilizing therapeutically the relationship which must surely exist between acne vulgaris and the sexual apparatus.

[1] *Arch. Derm. Syph.*, Chicago, 1939, **39**, 195, 200.
[2] *Brit. J. Derm. Syph.*, 1939, **51**, 119.

CARCINOGENIC EFFECTS OF THORIUM DIOXIDE

Experiments on animals have proved that thorotrast injected under the skin or into the peritoneal cavity may produce cancer within one to three years. But the quantities of thorotrast used in the animal experiments were relatively large and constituted about 5 per cent. of the body weight of the animal in Roussy, Oberling, and Guérin's[1] experiments, over 1 per cent. in Selbie's,[2] and over 0.5 per cent. in Foulds's.[3] In all these experiments the effect of the thorotrast injected was concentrated in one small area of the animal's body, and furthermore, according to Selbie, it was acting on tissue already inflamed by the thorotrast and therefore probably more susceptible to radiation than normal tissue. Clinical observations by Collins[4] on the local effect of thorotrast in mammography fit in with the results of animal experiments. In the two cases reported by him the thorotrast had only produced a local inflammatory reaction, but he believes that had enough time been allowed to elapse a malignant tumour would have probably developed. It would seem, therefore, that the use of thorotrast for mammography or for ventriculography must be condemned, as in both a substantial quantity of thorotrast remains permanently in the mammary ducts or in the cerebrospinal fluid. In such cases the formation of cancer round the main mass of the thorotrast is probably only a question of time, as in man it may take as long as ten or fifteen years for it to appear. Conditions are entirely different when thorotrast is injected into the blood stream, as in hepato-lienography or in arteriography. Here the colloidal particles of thorium dioxide are taken up by the vast reticulo-endothelial system—mainly of the spleen, liver, and bone marrow. The amount of thorotrast injected in such cases in man varies between 60 to 80 c.cm. in hepato-lienography and 7 to 15 c.cm. in arteriography—in other words, it amounts to from one-ten-thousandth to one-thousandth of the body weight. On account of the wide distribution of the contrast medium along the reticulo-endothelial system each reticulo-endothelial cell is exposed to a minute quantity of radiation, which possibly does not exceed that normally tolerated by human tissues. These theoretical considerations are confirmed by clinical experience. Thus, even after several years of observation, Yater, Otell, and Hussey[5] failed to note any injurious effect, either clinically or histologically, from thorotrast in patients who had had intravenous injections of 60 to 80 c.cm. for the purpose of hepato-lienography. Likewise, Moniz and Lima, Dos Santos, Löhr, and others who have been using thorotrast for arteriography in a large number of cases over a number of years have never observed a single case of injury to the reticulo-endothelial system or the formation of cancer. Temporary aggravation of symptoms caused by blocking of a number of capillaries by thorotrast following cerebral arteriography have, however, been reported by Northfield and Russel,[6] Ekström and Lindgren,[7] and others, and several cases of death following close upon cerebral arteriography have also been recorded. The method is therefore not without immediate dangers. It has, however, proved extremely useful not only for the diagnosis of cerebral tumour but often also for the recognition of the histological nature of the tumour; and it has been found invaluable for the diagnosis of cerebral aneurysm and malformations of the cerebral vessels. Many neurosurgeons and radiologists therefore naturally feel reluctant to give up such a valuable diagnostic method on account of remote risks which may never materialize.

[1] *Bull. Acad. Méd.*, Paris, 1934, **112**, 809.
[2] *Brit. J. exp. Path.*, 1938, **19**, 100.
[3] *Amer. J. Cancer*, 1939, **35**, 363.
[4] *Canad. Med. Ass. J.*, 1939, **40**, 440.
[5] *Radiology*, 1936, **27**, 391.
[6] *Lancet*, 1937, **1**, 377.
[7] *Zbl. Neurochir.*, 1938, **3**, 227.

AIRCRAFT PRODUCTION AND EYESIGHT

Few civilians have any idea of the amazing complexity of the engineering work done in the making of aircraft. Ignorance can be dispelled to some degree by the examination of such a periodical as *Aircraft Production*. In the current number there is a leading article which shows that engineers are as thoughtful of the good working of their operatives as they are of the working of their machines. Eyesight is obviously a dominant factor in the successful prosecution of all types of production, whether by machine or by hand. Good eyesight is essential to good work. The fineness of the work is a measure of the keenness of the vision demanded. This is especially true of war-time engineering in aircraft factories. Here operatives spend most of their time making or gauging precision parts to fine limits, and they require fine readings often on highly finished surfaces. To these exacting conditions there is now added the state of continuous artificial lighting. The writer of the article asks what effect such conditions may have upon eyesight. There is also a wise suggestion that the problem should be investigated, so that reliable data may be obtained. The fact that there is this demand for information is a good sign. But the suggestion that there are no sufficient data ready to hand is not borne out by the facts. Lighting in factories has been investigated by first-rate scientists and authorities in illumination. The fourth report (1938) of the Departmental Committee (Home Office) on Lighting in Factories is a most valuable document, to which attention has been drawn in our columns. Therein aircraft producers will find all they need on the facts of lighting. Further, there are advertisements in *Aircraft Production* which indicate that the illuminating instruments they need are already made and offered to them. On the more delicate question of the eyesight of the workers there is also a full body of information. For many years the need for special provision for those engaged in very fine and therefore close eye work has been recognized and effectively dealt with. One of the earliest tasks of this sort was the care of the "linkers" in hosiery production; perhaps the most trying form of work demanded of the eyes. That difficulty was satisfactorily solved by the ophthalmic surgeons in Leicester, one of whom was Wallace Henry. The conditions of the workers were examined by competent ophthalmic surgeons. It was found that the provision of plus sphere with prisms base in (together with any correction of error of refraction in the eyes) gave to these close workers the most effective help. Strain was relieved, work was better done, breakdowns were reduced to a minimum, and in every way the success of the enterprise from the point of view both of the operatives and of the organizers was ensured. There is therefore ample information upon which aircraft producers can draw. We wish them every success in their endeavours.

Professor Ernest W. Hey Groves will deliver the first Moynihan Memorial Lecture at the Royal College of Surgeons of England, Lincoln's Inn Fields, on Thursday, March 14, at 3 p.m.

MEDICAL PROBLEMS IN WAR

This is the first of three articles surveying the literature of neuroses in war

NEUROSES IN WAR

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Since the conditions of warfare now impose themselves in a much greater degree upon the civilian population, the number of psychiatric casualties in current hostilities is likely to be even larger than in the war of 1914–18. A survey of the observations and conclusions reached at that time, or more recently, may throw light on potential important psychiatric problems of the present day in civilian and military life.

Civilian Population

Bonhöffer, Roth, and Steltzner note that war, as we have all felt, arouses in the individual fear concerning the nation, the local community, and the family circle. The main sources of such fear are (1) the risk of attack and injury, (2) economic changes, (3) the threat of family separation, and (4) the threat of shortage of food and deprivation of luxuries and pleasures.

Individualism declines at the outbreak of war and is superseded by mass reactions, which show certain variations in spite of a general uniformity. The feeling of sharing a common danger leads to a strengthening of community ties and to a levelling of differences and opposition in social, economic, religious, and political spheres. In volunteers particularly the increased community feeling leads to a surrender of privileges and to self-sacrifice in the service of the country. Conversely, in some individuals anxious endeavours to protect the ego lead to a ruthless increase in selfishness. In most people the increase in community feeling results in a disregard of minor physical ailments, although hypochondriacal reactions may be observed in some. During the last war Bonhöffer noted a diminution in the number of those seeking medical advice not only in German luxury sanatoria but also in prisons. In his view a predominance of affective over intellectual values accounted for the amazingly widespread suggestibility, diminished critical faculty, and increase in wishful thinking which led to a distorted evaluation of the significance of news. Allied to this was the liability to the paranoid formation of rumours and the ideas of reference which lie behind exaggerated spy fears. With the alteration of moral standards in war (peace and war super-ego of Freud) latent aggressive tendencies became manifest. War, in general, releases taboos on aggressive tendencies which manifest themselves in sadistic fantasies and actions. At the outbreak of war a decrease in delinquency, not wholly attributable to the enlistment of criminals, was generally observed, and may be partly accounted for by the outlet provided for aggression. A corresponding increase of over 150 per cent. was recorded in Berlin during the period 1914–16; 97 per cent. of the 1916 cases were for larceny (Birnbaum, Liszt, Travers, Lindenburg, and Minde). The strain imposed upon the female population by the absence of their male companions resulted in promiscuity and a statistical increase in prostitution and venereal disease (Dessoir). Very little has been reported on the psychological reaction of children: Katz observed anxiety states and a minor epidemic of bed-wetting in children under his care.

Some observations are available on civilians actually involved in warfare. Most German writers stress the infrequency of psychological disorders in severely bombarded French villages, but no confirmatory French observations can be traced. According to Redlich, in refugees from invaded areas the resistance and capacity for adaptation were remarkable. In predisposed individuals states of depression and anxiety and hysterical syndromes were seen. Dealing with the effect of Zeppelin raids, R. P. Smith described conditions similar to those found in soldiers. An inquiry made at various London hospitals about the behaviour of patients during air raids showed the absence of any marked reaction. Similarly, according to Hoche in Germany and, more recently, Mira in Spain, the civilian population stood up surprisingly well to the terrifying experiences of repeated air attacks. In Barcelona the air raid shelters, although adequate for only 10 per cent. of the population, were by no means crowded. Hoche described as the main sources of anxiety (1) forced passivity without any means of escape or retaliation, (2) the whistling of the falling bomb before the actual detonation, (3) the vivid and contrasting auditory and visual sensations resulting from the detonation, especially in darkness. In those not actually involved in the explosion the immediate results were the usual symptoms of anxiety—trembling, pallor, sometimes forced laughing, diarrhoea, and increased urinary excretion and hence marked thirst. These symptoms passed off quickly in the well-adjusted. People of advanced age tended to show an increased tolerance, and in some neurotic patients anxiety arising from internal conflicts was diminished in face of an acute external danger. In severely bombarded towns the civilian population suffered from anxiety states lasting for weeks, with disorders of sleep, acoustic hypersensitivity, starting at the slightest sound, constant anticipation of noise, heart symptoms, polyuria, glycosuria, vomiting, diarrhoea, and amenorrhoea. In recent Spanish experience Mira reported a number of cases of a malignant type of anxiety characterized by lack of concentration, motor inactivity, tachycardia, and panting respiration, in some cases leading to death in three or four days. Typical hysterical fits, especially of screaming, were frequent in Hoche's observations (1916) but rare in Mira's (1938). As a rule only those in the neighbourhood of bomb explosions developed acute nervous symptoms. A psychic epidemic was reported by Wedekind in girls working near the front in a munition factory frequently visited by aeroplanes. Fits of trembling and prolonged loss of consciousness occurred on the slightest provocation: the sight of over a dozen girls lying on the floor in convulsions was not uncommon. According to Nöggerat and Mira, during air raids well-balanced children were indifferent, and anxiety and excitement were observed only in families where the parents were excited (Siegert).

Observations on Soldiers

The life of the soldier, especially in the front line, is characterized by the exclusion of individuality in a mass experience which alternates between the danger of death

and the desire to escape, and complete devotion to a task which requires no reflection but entirely consumes the will (Kronfeld). Change of occupation, separation from family, and submission to a new form of discipline form the initial stresses of the soldier. Meaningless petty restrictions, in the absence of any opportunity to retaliate, lead to emotional tension in those unaccustomed to submission. The suppressed individuality may find an outlet in the use of aggressive and obscene language or give rise to violent outbursts or attacks on superiors (war frenzy: Stransky and Laudenheimer). According to the statistics of the German and the Swiss armies (Staely, Strasser, Uhlmann, H. W. Mayer) in a certain number of soldiers mobilization precipitated nervous symptoms, most frequently functional gastric and cardiac disorders, enuresis, disturbances of sleep, and anxiety states. In 0.15 per cent. of the troops of the Swiss army a "mobilization psychosis" characterized by delirious states was described by Uhlmann. Three-quarters of these cases were better in less than six months.

Hefele records that the boring monotony of prolonged non-combatant service in the rear leads to passivity, indifference, and depression. Autobiographic reports and observations illustrate the psychological changes engendered by front-line experience (Schneider, Stransky, Löwy, Neumann). Bartlett and Everth described the animal-like pleasure and the feeling of freedom in their new existence felt by many soldiers on arrival in the trenches. In contrast to the period of training, petty annoyances are over and there is a feeling of comradeship with superiors. In general there is an attitude of endurance and patience, with no marked enthusiasm except for the moments of ecstasy described in "going over the top." There is a general dulling of intellectual life; strong impressions are constantly repeated; the soldier tires of the scenery and uniforms around him and would easily break down if the constant physical danger and strain did not absorb his whole attention. As regards the risk of death he feels he shares his fate with many others. Bartlett differentiates two types of courage: the first based on indifference arising from the decreased mental activity mentioned above; the second, "genuine courage," involving the control of normal fear by sentiments, ideas of self-respect, social traditions, and morale. The main sources of mental stress for the front-line soldier are danger of death, guilt over killing, increased responsibility, separation from family, and sexual deprivation.

Danger of Death

Most soldiers on approaching the front line displayed uneasiness and apprehension by restlessness, irritability, artificial jocularity, or silence and withdrawal, or by unusual perspiration, diarrhoea, and frequency of micturition, lasting a few weeks. Inactivity under harassing fire is said to affect the mental health of the soldier more than active warfare (Rivers, Scott Jackson), while the prolonged uncertainty and fear of a land mine is regarded as the most potent source of mental tension (Hoche). Any protection, however ineffective or inadequate, as in covering the face with a cloth, serves to allay the mental tension of the soldier (Schneider). Constant emotional tension is discharged in various ways, as exemplified by the "go-getter," the panic-stricken, and the apparently calm individual who remains at his post. Courage, according to Kronfeld, is more of a mass than an individual phenomenon, and in the neurotic individual exceptional courage may arise from fear of ridicule. "Going over the top" relieves pent-up anxiety, which is transformed into rage, while cowardice was often revealed to be due to specific phobias (Stransky). Aided by community feeling, patriotism, and a religious and philosophic outlook, the vast majority of the soldiers manage to adapt themselves to a situation that appears almost intolerable. Severe and prolonged stress may precipitate a breakdown in almost everybody. After exposure to severe shrapnel fire a whole company was noted by Redlich to develop hysterical symptoms—for example, crying fits and vomiting.

Guilt over Killing

Normally our aggressive or sadistic tendencies are repressed by our civilization, mainly through the influence of early surroundings. In peace these aggressive tendencies may express themselves in a sublimated form in physical exertion and dangerous exploits. In war "a premium is put upon blood-thirstiness and the community extols the individual who is most effective in inflicting injuries upon the bodies and lives of the members of an opposing group. This becomes, in effect, a sublimation, for now the soldier can by the same acts give vent to his primitive passions and reap the approbation of his fellows" (MacCurdy). In some, however, the conflict between early teaching and the demands of war may precipitate a breakdown.

Such phenomena as the display of unrestricted aggression can be most easily understood as manifestations of a regression to an infantile type of behaviour, similar to the reactions seen in everyone in the face of a terrifying experience such as an earthquake. Archaic mechanisms are brought into action; but the well-balanced individual, after a period of temporary regression, readjusts himself at the new level, whereas the neurotic individual fails to do so.

Increased Responsibility

For many enlistment in the Army meant relief from responsibilities; but for N.C.O.s and officers, especially where they were subject to strain from the need to keep up an appearance of courage, their new position acted as a cause of mental unrest and contributed in no small degree to nervous breakdown. "The burden of increased responsibility may also account for the higher incidence of nervous disorders in married men" (Report of War Office Committee on Shell Shock).

Sexual Deprivation and Separation from Family

Terrifying front-line experiences affect the soldier sexually in two different ways. More often than not a diminution of sexual interest was observed (Wexberg and Löwy). In others spermatorrhoea and dreams with a sadistic sexual content occurred (Schneider). Homosexuals proved efficient and enduring soldiers (Burchard). In bisexuals a diminution of the relevant taboos relieved guilt about homosexuality in some, whereas in others guilt reactions were aggravated.

Classification and Incidence of War-time Neuroses

Neuroses in war time embrace the following groups: (1) pre-war neuroses which are continued unchanged; (2) pre-war neuroses aggravated in war time; (3) character disorders developing manifest neurotic symptoms; (4) neuroses occurring in apparently well-adjusted individuals, defined by MacCurdy as functional nervous conditions arising in soldiers, immediately determined by the conditions of modern warfare and with a symptomatology whose content is directly related to war.

A survey of the literature is complicated by the varying terminology of the classifications used in various countries by various authors. Aetiological and symptomatological

classifications were used indiscriminately, as in the labels "shell shock," "neurasthenia," and "hysteria." The ill-defined group "neurasthenia" probably contains exhaustion states, anxiety states (W. H. Rivers and H. Head), and depressions, while the term "shell shock" connotes a traumatic aetiology, is difficult in relation to pensions, and has largely been abandoned (Report of War Office Committee on Shell Shock). As it has become obvious that there is no fundamental difference between peace and war neuroses, the generally accepted terminology of peace-time neuroses is now used for both.

It is difficult to obtain an accurate estimate of the incidence of neuroses during the last war.

(*a*) British Expeditionary Force.—According to the *Official History of the War* the problem in the B.E.F. did not become acute until July, 1916, when several thousand patients were rapidly passed out of the Somme battle zone. An analysis of 1,043,653 British casualties revealed that neuroses formed 34 per 1,000 casualties. On occasions neuroses made up 40 per cent. of the casualties evacuated home. In 1918 out of a total of 160,000 pensioners 32,000, or 20 per cent., were receiving pensions for functional nervous and mental disease (Collie), while in 1921 this figure had risen to 65,000 (*Official History of the War*).

(*b*) Canadian Expeditionary Force.—Of 180,496 casualties occurring 24 per 1,000 were included in the category of nervous and mental disease (Briggs).

(*c*) American Expeditionary Force.—The total number of admissions of enlisted men suffering from functional nervous disease during the period April, 1917, to December, 1919, was 32,983, equivalent to 9.5 per 1,000 casualties. The attempt to eliminate potential neurotics from the American Expeditionary Force, and its comparatively short period of active service, must be remembered when considering this figure.

Observations in various armies agreed that (1) the incidence was relatively greater in fresh troops arriving in the front line, in battle-tested troops after prolonged trench life without a break (Russell), in men over 40, especially married men (G. Holmes, W. Brown), and in rapidly trained volunteers, as compared with the Regular Army (Bailey); (2) the incidence rose considerably after severe military operations. Actively advancing troops were less apt to break down than inactive or retreating troops; (3) analysis of the incidence in various branches of service showed that technicians working at the front under extreme hazard—infantry and machine-gunners, engineers, artillery, and tank corps—rank high in the list (Fenton and *Official History of the War*; and Ayres: Shell Shock Report).

Aetiology

The pathological findings in a few cases led early writers to attribute neurosis in war to physical causes (Mott, Oppenheim, and Von Sarbo), including carbon monoxide poisoning (Mott, Hübner, Soltau).

In cases with negative findings molecular changes in the nervous system were postulated; but the occurrence of severe concussion without ensuing nervous symptoms, the low incidence of nervous illness in groups sharing the same trauma, and rapid recovery under psychotherapy strongly countered this view (Culpin, MacCurdy, Eder, Viets, Wiltshire). The condition was ushered in by concussion in less than 10 per cent. (W. Brown, Holmes, Hart) or 25 per cent. (Graham Brown, MacCurdy). Concussion and concussion neurosis have to be considered as separate entities, the concussion acting as a precipitating factor in concussion neurosis.

The French school of thought (Roussy, Brisseau, D'Oelsnitz, L'Hermitte, and Lépine) distinguished the "commotionné" from the "émotionné." Under the name of "physiopathic disturbances" Babinski and Froment described a group of "reflex disorders" which occupy a position half-way between organic affections and hysterical disorders. A reflex contracture, for example, was initiated by an organic nervous lesion and subsequently fixed by a psychological mechanism resembling that of hysteria.

Exhaustion

Fatigue, exhaustion, whether physical or mental in origin, exposure to inclement weather, loss of sleep, lack of food or water, may disturb the tense mental state of the front-line soldier. "The constant stress of exposure to something extremely distasteful, whether the distaste may be common to all mankind or an idiosyncrasy of the patient, as well as the struggle against symptoms already in existence," may lead to states of fatigue (MacCurdy). Nearly all cases admitted to casualty clearing stations were in a state of fatigue; associated symptoms described are perspiration, palpitation, feeling of giddiness and fainting, praecordial pain, breathlessness on exertion, and weakness of limbs (Jolowicz, Brugsch). Acute exhaustion states differ from chronic fatigue states seen after prolonged trench life. A true exhaustion state passes off after a few days' rest, but patients with "neurasthenia" and an anxiety state usually gave histories of fatigue reaction in the line that was disproportionate but not acute (MacCurdy). A special group labelled "exhaustion neurosis" is outlined in the American literature.

More often than civilian neuroses, military neuroses are preceded by terrifying experiences whose action can only be understood in conjunction with the mental make-up of the individual, and will be considered in detail under the heading "Psychopathology."

Predisposition

A majority of psychiatric authors believed that, given sufficient emotional stress, neurotic symptoms may appear in anyone, and that the existence of neurotic symptoms in civil life predisposes to their reappearance in an increased and altered form in war (G. Roussy, Forsyth, Dupony, Campbell). Psychopathic personalities are said to be "martial misfits" (Hurst). A review of the facts in the light of subsequent knowledge, however, suggests that there were many exceptions to this generalization. Individuals with previous anxiety symptoms, depressed, sensitive, timorous, and phobic individuals, were as a rule unable to stand the stress of war; whereas some obsessionals, certain types of psychopathic personality, psychotics, and mental defectives often did very well as soldiers. Such patients not infrequently broke down on return to civil life.

Systematic statistical research on familial and personal predisposition in neurotic soldiers, undertaken without regard to clinical classifications, gave inconclusive results. Studies in small groups seemed to confirm the common belief in family and personal predisposition (Wolfsohn), but a comparison of findings obtained in an average regiment in the United States (Bowman) with those of a neuropsychiatric base hospital in France showed "that the preponderance of heredity for the mass of neuroses and psychoses is but a trifle more than for healthy individuals" (U.S. Army Medical Department). Sixty-three per cent. of neurotic soldiers, compared with 46 per cent of average soldiers, gave combined positive family and personal histories; 52 per cent. and 39 per cent. respectively gave positive personal histories.

Reports of Societies

PHYSIOLOGICAL PROBLEMS OF HUMAN FLIGHT

At the meeting of the Medical Society of London on January 29 Group-Captain G. STRUAN MARSHALL, consultant in applied physiology, R.A.F., gave a lecture on "Some Physiological Problems of Human Flight."

Oxygen Want

The limiting altitude for human capability, he said, was from 18,000 to 20,000 feet. If, however, pure oxygen instead of air could be breathed the limit was 44,000 feet. These figures were not put forward as exact, but round about these altitudes the curve became much steeper, so that one of the principal problems of high flying was a reduction of the oxygen pressure and consequent failure of the mechanism of oxygenation of the body.

To meet this oxygen want it was possible to add oxygen to the air breathed and thereby raise its volumetric proportion and its partial pressure. He went on to describe some interesting experiments in which a man had been enclosed in an airtight chamber under conditions equivalent to those at high altitudes and fed with oxygen. The subject of the experiment jotted down his impressions on a writing pad while in the chamber, and Group-Captain Marshall was able to show these to the Society. At the equivalent of 37,000 feet the man, breathing oxygen, was doing perfectly well and recorded his own pulse rate and so forth in a normal manner. At 43,000 feet, however, he began to show the symptoms of oxygen want. He would write the first syllable of a word and keep on writing it, and the writing as well as the ideas seemed to dither. He also spelt the word "wrighting," a thing which, as an educated man, he would never have done under normal conditions. At this height he was like a hysterical child "tickled to death," and he would write down such a sentence as "I told you so," followed by five exclamation marks.

The lecturer also showed illustrations of the one-piece suit used by airmen, this being inflated with oxygen, which by a mechanical device is kept in circulation, so that all carbon dioxide and moisture in the circulating gas are removed. He indicated the various safety devices which the suit incorporated, and the ingenious construction of the headpiece. He said that a man in such a suit, even if he entered a complete vacuum, could just about live.

Limitations concerned with Movement

Turning to another problem of high flight, Captain Marshall discussed the physiological limitations concerned with movement. The first of these was that of acceleration. The forces encountered by aircraft during flight were frequently of the order of four times the pull of gravity. Some pilots thought it would be an advantage if they could with impunity apply very much greater acceleration, even up to eight or ten times gravity. But this introduced a very considerable problem. A man who weighed 200 lb., if he accelerated in an aircraft at ten times gravity, would have a weight of close upon one ton—a weight which his tissues were not built to carry. The first symptom of excessive acceleration was known to the pilots as "blacking-out," or by the Germans as *der Borhang*, meaning "the curtain." It happened when a certain degree of acceleration was applied and maintained for a sufficient time. The vision became dimmed; there was no imperfection of acuity—in fact, in some ways objects seemed more acute, as if one were looking through a small minus lens—but a yellowish or greyish tinge appeared, which deepened to complete blindness, although consciousness was not in the least affected. In the case of the average man an acceleration of from three and a half to six times gravity would suffice to produce blindness; a highly trained man might stand up to seven or eight times, or even more if he could get himself into such a posture as would stop the blood from pooling in the belly.

The cause for this blacking-out was that, as every tissue in the body had taken on an increased weight, the liquid tissues, which were the only ones free to move, had begun to do so, and the space in which there was room for them to move was, of course, the splanchnic area of the viscera. Experiments were now being carried out with a view to meeting this problem, but they were for the present secret. In reply to one member who mentioned that the simple expedient of lowering the chin had sufficed to relieve the blacking-out, Group-Captain Marshall said that this was probably because the chin was not the only part of the body which was lowered in the same effort. If the lowering of the hydrostatic head was only a matter of two inches the pressure would be reduced in that proportion, and therefore the blacking-out would be less likely to occur. Much depended upon the firmness of the abdominal wall. The difference in height of the umbilicus when the body was in the bowed position as compared with the upright position might make it possible to withstand the additional pressure. One piece of advice which he gave to pilots in these circumstances was to scream at the top of their voices; that had the effect of indrawing the belly wall to a marked extent, and was quite a good method of avoiding the blacking-out.

The effect of high altitudes and low atmospheric pressures on blood pressure was negative provided there was sufficient oxygen pressure to maintain the oxygenation of the blood. As soon as the oxygen partial pressure was normal or about normal the blood pressure and pulse became normal also. He was asked about the cases reported of bleeding from the nose and ears during a power dive. He said that he had never seen such cases, he had heard about them only. He could only think that such bleeding was due to failure to equalize pressure inside and outside the tympanic membrane. If the Eustachian tube was patent, then equalization would occur through that. Otherwise the cause must be due to the fact that the valve opened from inward pressure but not from outward pressure. As the pilot ascended the air would ooze out of the valve with increased altitude, but as he came down again the air would endeavour to get into the Eustachian tube, and if it were not able to do so would push in the tympanic membrane with terrific force. The atmospheric pressure would be 14 lb. to the square inch, and he imagined that there might be half a pound or a pound of pressure on that tiny surface. If the dive was very sudden the membrane quite commonly split. This might be associated with the bleeding reported in various cases.

One question addressed to the lecturer was as to the limits of speed. He said that as soon as the speed of flight began to approach the speed of sound in the air [sound takes 5 seconds to travel one mile, and already aeroplane speeds up to 600 miles an hour have been recorded] entirely fresh aerodynamic problems appeared, and no aircraft constructed on present principles would go very much above speeds of this order, though possibly some device of the rocket type might do so. But in the case of the person in the aeroplane speed itself meant nothing. One had only to think of the enormous speeds at which we were all travelling unconsciously and with impunity—the diurnal rotation and annular movement of the earth.

Why does "Blacking-out" Happen?

Finally Group-Captain Marshall gave his own explanation for the phenomenon of "blacking-out" which he had described, though he added that an ophthalmologist whom he had consulted did not agree with him. As acceleration continued, obviously the hydrostatic head available in the circulation fell away, and with the pooling of blood in the belly there was less blood available for circulation in the upper part of the body. Consequently the arterial pressure at any point in that circuit must fall until eventually it came to nought—in other words the blood would stop moving. At something like six and a half times gravity the heart and liver dropped about four inches and the aorta was completely empty. On the other hand, the eye in health always had an intra-ocular pressure of the order of 20 to 25 mm., so that the blood circulating to the eye had to overcome that initial resistance; just as when pumping a

cycle tyre a greater pressure had to be maintained in the pump, so there must be a greater pressure of blood outside than there was in the eyeball. With a fixed pressure of 20 mm. in the eyeball it followed that as the arterial pressure fell away the eye must be the first to suffer. At 15 mm. there might be still enough pressure to enable the blood to trickle round the brain in a lethargic sort of way, but it was not enough to allow the blood to enter the eye at all, and none whatever would get in. That, to his mind, was the cause of the blacking-out and the eventual blindness.

Local News

ENGLAND AND WALES

Harveian Society's Buckston Browne Luncheon

The customary dinner of the Harveian Society of London at which the Buckston Browne prize is annually presented was this year replaced by a luncheon, which took place at the Langham Hotel on January 31. The chair was taken by the new president of the society, Professor Frederick Langmead, and among the guests was the Minister of Health, Dr. Walter Elliot. Others present included Mr. Hugh Lett, President of the Royal College of Surgeons, Lord Horder, Sir Walter Langdon-Brown, Sir William Willcox, Sir Alfred Webb-Johnson, Sir Charles Wilson, Professor Grey Turner, and Dr. W. A. Daley, Chief Medical Officer of the London County Council. Dr. A. D. Morris, in proposing the toast of "The Harveian Society," mentioned the curtailment of the society's activities which the war has imposed, but he said that events—or the lack of events—had made possible a partial resumption of the programme, and advantage was taken of the opportunity to present the Buckston Browne prize and to welcome the new president to the chair. Professor Langmead, in response, said that it had sometimes been asked what claim the society had to the name of Harvey. There was possibly this consideration in the minds of the founders—that Harvey believed in the meeting together of doctors not only for the furtherance of their professional knowledge but also for convivial reasons, and the society endeavoured to uphold both sides of that tradition. Sir Buckston Browne then presented his prize to Dr. Robert Kemp and Dr. J. Aitken for the best and second-best essays respectively on the subject of "The Value of Periodical Medical Examinations in Middle Life." Sir Buckston Browne said that the present gathering showed how determined the Harveians were to carry on. He had been a member of the society for sixty-six years. When he was quite a young man the society honoured him by making him Harveian lecturer. The remuneration was not to be despised in those days—fifteen guineas for the three lectures—but the giving of those lectures had an immense effect on whatever success he had met with in his profession as a private surgical practitioner in London.

Course on Mental Deficiency

A course of lectures and clinical instruction for medical practitioners on mental deficiency and allied conditions is being arranged by the University Extension and Tutorial Classes Council in co-operation with the Central Association for Mental Welfare. The course will begin on Monday, April 8, and end on Friday, April 20. It is based on the requirements for the University of London Postgraduate Diploma in Psychological Medicine, and is intended for qualified medical practitioners, more especially those who are engaged as school medical officers, certifying officers to local authorities under the Mental Deficiency Acts, or as medical officers of institutions, or who are otherwise definitely concerned with the care of subnormal or abnormal persons. It includes instruction and practice in mental testing under the supervision of a psychologist. All lectures will be given at the University of London, London School of Hygiene and Tropical Medicine, unless otherwise stated on the students' time-tables. The clinical work consists of attendance at one or more demonstrations of individual cases of defect to small groups of students, and endeavours will be made to arrange visits to certified institutions and special schools if war-time conditions allow. The mental testing of individual children will be carried out as centrally as possible, but, if more travelling is entailed than usual, students are asked to bear in mind the difficulty of organizing this type of work under present conditions. Detailed time-tables will be sent not later than March 30 to each person proposing to attend the course. The University will grant certificates of attendance to those who attend regularly, taking both theoretical and practical work. Registration fee (to be paid at time of application), 10s. 6d.; fee for course (payable before March 17), £5 15s. 6d. As the course can be held only if sufficient applications are received, intending candidates should apply at the earliest possible date, but in any case by February 28. At the beginning of March those who have applied will be informed whether the course is to be proceeded with or not. The right to cancel the course is reserved, however, should war conditions make it impracticable to hold it. Cheques should be made payable to Miss Evelyn Fox, C.B.E., Central Association for Mental Welfare, and crossed Barclays Bank, Ltd. All communications should be addressed to her, c/o University Extension Department, University of London, London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.

Maternity Service for the Wives of Officers and Men

A special maternity service for the wives of junior officers and other ranks of H.M. Forces is being established at the Middlesex Hospital, London. Individual members of the honorary medical staff have offered to give their services and have declined to accept any fees. Accommodation will be provided in small ward units, with a curtained cubicle for each patient, adjacent to the Lord Ludlow wards. An inclusive charge, which is at present fixed at twenty guineas, will cover any length of stay in hospital, including the period before the birth of the baby and expert medical and nursing care, and supervision of the baby by a children's specialist. Applications from the wives of officers and other ranks should be made in the first instance to the secretary, Woolavington Wing, Middlesex Hospital, London, W.1. This maternity service is not available for the wives of officers above the rank of lieutenant in the Navy, captain in the Army, or flight lieutenant in the Air Force.

Treatment of Tuberculosis

The Minister of Health has received a number of inquiries concerning the responsibility as between different local authorities for the treatment of tuberculous patients who have been evacuated either under the Government scheme or under private arrangements. In a circular to local authorities the Minister states that the primary responsibility for the examination and treatment of patients suffering or suspected to be suffering from tuberculosis, including all dispensary facilities, and such additional help as extra nourishment, artificial pneumothorax refills, etc., must rest with the authority of the area in which the patient is living at the time. Local authorities will follow their usual practice as regards contributions from patients, but it is suggested that all patients should be treated alike in this matter, whether they lived in the area before the war or have gone there since. No contribution, however, should be required for the treatment of unaccompanied children evacuated under the Government scheme. This cost will be settled under the general arrangements for reimbursing local authorities for the care of casualties under the Emergency Hospitals Scheme.

In reply to a deputation from the Socialist Medical Association the Minister of Health stated that 125 tuberculosis institutions had been released entirely from their obligations

to the Emergency Medical Service since November 1, 1939, so that the whole of their accommodation could be devoted to their normal work. The various associations concerned in the treatment of tuberculosis had at his invitation appointed a small committee to maintain contact with the Department. More than two-thirds of the 28,000 beds in England and Wales for the treatment of tuberculosis were still available for that purpose, and, since there were about 3,000 vacant beds, the admission of new cases should not present any difficulty.

SCOTLAND

Emergency Bacteriological Service

The arrangements to provide Scotland with a bacteriological service for the duration of the war are set out in a circular issued to local authorities by the Department of Health for Scotland. The scheme is based on the central laboratories established at the four Scottish universities under the general supervision of the respective professors of bacteriology. In addition, subsidiary laboratories have been set up at various centres. In most cases these subsidiary laboratories are existing institutions, but three are in effect new. Each of the subsidiary laboratories functions autonomously but works in conjunction with the appropriate central laboratory under the supervision of the professor of bacteriology. Provision has also been made for the setting up of emergency laboratories in remote districts in the event of serious local outbreaks of infectious disease. The object of the scheme is to guard against any dislocation which might arise as a result of the war by co-ordinating the available services and utilizing to the fullest possible extent the resources, including personnel, available for bacteriological work in Scotland.

Scottish Maternity Services

During the six months to November, 1939, 1,308 maternity cases, or 63 per cent. of the mothers in the county of Lanarkshire confined in their own homes, were dealt with under the county council's new maternity services scheme, which came into operation last May. The scheme, which was made under the Maternity Services (Scotland) Act, 1937, enables every expectant mother to obtain in her home at a reasonable charge, or free if need be, the services of a qualified midwife and a medical practitioner. If the doctor considers it necessary the assistance of a specialist obstetrician can also be obtained for the same all-in fee. Patients with incomes below the limit of national health insurance are asked to pay 30s. for the all-in service, and persons with incomes over this limit are asked to pay 65s. These charges, however, are graded down in cases where the patient cannot meet the full charge owing to financial circumstances. In Lanarkshire eighteen out of the 2,081 patients booked since the inception of the scheme paid the maximum fee of 65s., 1,753 paid 30s., 193 paid sums varying from 25s. downwards, and 117 were unable to make any payment. The total cost of the scheme to the county during the six months amounted to £4,729, of which 36 per cent. has been returned in patients' fees. No serious administrative difficulties have been encountered.

While at present the majority of the mothers taking advantage of this service belong to the population insured under the National Health Insurance Acts, it is expected that as the scheme becomes better known larger numbers having incomes above the limit for insurance purposes will apply for the benefit of the Act. It is understood that the Government does not intend that the development of local authority schemes under the new Act should be held up because of war conditions; the war has not lessened the need. Thirty-five schemes, covering thirty-seven of the fifty-five local authorities in Scotland responsible for maternity services, have been approved, and most of these are now functioning. Some fifteen further schemes are in an advanced stage of preparation.

Correspondence

Treatment of Infected Burns

SIR,—May I offer my congratulations to Surgeon Lieutenant Murless (*Journal*, January 13, p. 51) on his treatment of infected burns with tannic acid. I have now treated a small series of infected second- and third-degree burns and scalds, admitted to hospital 120 to 140 hours after injury. All patients were children, and were admitted with temperatures ranging from 103° to 105° F. Three cases exhibited a generalized scarlatiniform rash. After rapid and gentle cleansing under gas-and-oxygen anaesthesia, coagulation of the raw surface was obtained with either tannic acid or tannic acid and silver nitrate. Following the administration of prontosil the temperature fell to 99° F. within twelve hours. Thereafter the course of the illness was apyrexial, and separation of the coagulum occurred within ten to twenty days. Fluctuation of the coagulum was never seen, as the eschar was dehydrated with ether and painted with a 1 per cent. solution of gentian-violet in spirit at frequent intervals. The occasional use of the electric drier also assisted in keeping the coagulum dry.

As Mr. Joshua S. Horn points out in your issue of January 27 (p. 148), deep burns are usually adequately coagulated by the heat causing the injury, and severe toxaemia is rarely seen in this type of injury. Early excision of the damaged area is rarely practicable, and the application of tannic acid is surely a waste of time.

I was much interested in Dr. William Clayton's letter in the same issue (p. 148) explaining interfacial coagulation with cod-liver oil and "foille." I have had the opportunity of treating patients with tannic acid and with one or other of the above oily coagulants simultaneously. If one may presume that the injuries are comparable in both legs of a patient scalded with boiling water the following observations may be of interest:

1. The area treated with tannic acid was healed almost a week before that treated with the oily preparation.
2. The tanned area was free from pain from the time of primary coagulation; the oil-treated area was not painless.
3. The attention required by the tanned area was considerably less than that required by the part dressed with the oily preparation.
4. The patient preferred the tannic acid treatment.

Both cod-liver oil and "foille" are excellent dressings during the granulating stage of deeper injuries, but I would hesitate to depend on either to prevent the onset of secondary shock or toxaemia in an extensive superficial lesion. Incidentally, in burns treated with cod-liver oil or "foille" the temperature is erratic during the first week of the illness. With the modified Davidson or Bettman techniques the course is commonly apyrexial after the first forty-eight hours.—I am, etc.,

Glasgow, Jan. 29. WALLACE M. DENNISON.

Cod-liver Oil in the Treatment of Burns

SIR,—Dr. William Clayton (*Journal*, January 27, p. 148) has suggested that cod-liver oil may, due to the formation of interfacial films of proteins, etc., have a specific action on mustard-gas burns. He attributes the specific action largely to the polar groups of the molecules of the oil. I have made a study of interfacial protein films (see summary, Cold Spring Harbor Symposia, 1938), which shows that, generally speaking, the more polar an oil the less protein it absorbs per square centimetre, and the less rigid is the resultant film—that is, polar groups decrease the efficiency of protein film formation. Hence any specific action of cod-liver oil cannot be attributed to the polar groups in the general sense. But occasionally oils containing particular compounds—for example, cholesterol and soap, or lecithin with soap—form unusually thick interfacial films with proteins. This is probably due to the formation of complexes containing oil

and protein molecules which are of a rather specific character, probably similar to those studied by Schulman (recent papers in the *Transactions of the Faraday Society*). Such complexes may be dependent on the existence of a particular polar group in the oil. Consequently, we can anticipate that the specific action of cod-liver oil, if verified, is due to immobilization of toxic substances by specific adsorption. If the nature of the active oil molecules could be ascertained it seems probable that more active preparations could be obtained.—I am, etc.,

Biochemical Laboratory, Cambridge, Feb. 1. J. F. DANIELLI.

Penetrating Chest Wounds

SIR,—As I belong to the "new generation of medical officers" referred to by Dr. F. G. Thomson in his article in the *Journal* of January 13 I was most interested in the report of his experiences of penetrating chest wounds. Although I have no experience of gunshot wounds of the chest, certain practices and principles which have evolved from the progress of thoracic surgery since the last war seem to me applicable to these types of wounds, and it is for this reason that I hope the following comments may seem pertinent rather than impertinent.

In Dr. Thomson's discussion of the treatment of infected haemothorax and empyema reference is made to the "intolerable pain" caused by a drainage tube which is fixed in position by firmly stitching it to the skin; on this account water-seal drainage necessitating a long extra-thoracic connexion is condemned. In civil practice an empyema which has been drained by rib resection is frequently closed firmly round a drainage tube which is connected to a tube passing under water in order to aid re-expansion of the lung; at its point of exit from the chest the tube is transfixed with a safety-pin moulded to the shape of the chest and fixed to the skin with half-inch adhesive plaster after applying friars' balsam. By this means the tube is held firmly in place and no pain is experienced. Dr. Thomson recommends drainage by a self-retaining intercostal catheter to which a "flutter-valve" is adapted. I think there is general agreement that such a catheter inserted by means of a trocar and cannula under local anaesthesia is the correct treatment of an empyema in a patient who is unfit for rib resection, but I would suggest that the self-retaining capacity of the catheter should be reinforced by safety-pin transfixion as already described, and that water-seal drainage is cleaner and more reliable than the "flutter-valve."

I was most interested to observe that 16 per cent. of 250 cases seen at an advanced base hospital were suffering from pulmonary collapse, but was surprised that shift of the mediastinum *towards* the side of the collapse was not referred to as the means whereby this lesion can be distinguished from haemothorax; such shift manifests itself clinically by displacement of the heart and often the trachea, and is readily confirmed by radiology if facilities are available. It has been shown conclusively that lobar collapse is produced by bronchial obstruction; in gunshot wounds of the chest pulmonary collapse presumably results from obstruction of a bronchus by tenacious mucus or even blood clot which fails to be expectorated. This explanation is readily understood, whereas the statement that "the lung appears to be stunned by the concussion" means very little.

The author suggests that the early closure of penetrating chest wounds is a "very doubtful procedure" owing to the high incidence of infection of the wound, which subsequently breaks down. If the pleura becomes infected after thoracotomy in civil practice the wound very rarely breaks down if the pleura has been drained from the time of the thoracotomy, whereas it usually does so if no drainage has been provided. Although this type of case is not directly comparable to penetrating chest wounds, as no tissue from the chest wall is excised, is it not probable that the risk of breakdown would be minimized by pleural drainage at the time of wound excision, so that the internal surface of the wound is not constantly bathed with pus if pleural infection ensues?—I am, etc.,

London, W.1, Jan. 30. OSWALD S. TUBBS.

Treatment of War Wounds and Infected Fractures

SIR,—The treatment of war wounds and infected fractures by the closed plaster or Winnett-Orr method is one which is likely to be adopted during the present war, and the recent correspondence in the *Journal* is of great interest. Mr. R. Watson Jones has very concisely stated the indications for its use and also for the ideal treatment for these cases—namely, primary suture (*Journal*, October 21, 1939, p. 826). He has not emphasized, though, that under conditions likely to prevail in the field it may be difficult to get the wounded to a properly equipped and staffed operating unit within the optimum time for treatment by primary suture, and it would appear, therefore, that the closed-plaster method would have to be used in the majority of cases.

None of your correspondents has mentioned the experience of several French surgeons who have had the opportunity of seeing many of the Spanish wounded treated by the closed-plaster method. They give it only qualified approval, and insist, as Dr. Trueta does in his recent book, on the importance of the closed treatment being "employed only by those qualified by training to plan and undertake the first stages of the technique." In a recent paper M. Paul Mathieu in *La Presse Médicale* (October 18, 1939, p. 1413) draws attention to some of the dangers which may follow its use: (1) the danger of reactionary oedema, which by constricting the circulation may give rise to serious complications necessitating amputation; (2) the difficulty of observing the wound under the plaster: suppurative arthritis, sloughing of the skin at pressure points, abscess formation, etc., have all been observed by these French surgeons in the Spanish wounded, and—a point to be remembered—these complications frequently develop silently, without pain, without swelling, and with little disturbance of temperature. Another danger—although not common in the Spanish cases owing to the arid nature of the soil, but obviously one which would be of greater frequency in the more cultivated battlefields of Western Europe—is from gas-gangrene infection. This condition could set in without the surgeon's knowledge if he is unable to watch the wound. It must be conceded, though, that a thorough excision of the wound is a *sine qua non* of the treatment, and if this is done properly such disasters should be rare. Nevertheless the risk is a real one and has not been sufficiently emphasized. The closed plaster is considered by the French surgeons to be of advantage in allowing the easy and comfortable evacuation of the wounded, particularly over long distances, and the rarity of dressings is a boon and a blessing.

It would seem, therefore, that while the closed method gives excellent results in hands such as those of Dr. Trueta it has many pitfalls for the inexperienced, and, above all, for those who fail to appreciate the importance of thorough excision of the wound. Unsatisfactory results could be minimized if these young and inexperienced practitioners who now find themselves faced with these very problems had the benefit of a course of instruction on lines such as that provided by the French medical service at the Centre d'Etudes at d'Enseignement Médico-chirurgical at Bouleuse during the great war.—I am, etc.,

Feb. 2. E. J. MOYNAHAN, M.R.C.S.

Treatment of Gas Injuries to Eye

SIR,—During the past four or five months correspondents—in about twenty letters—have written on the treatment of gas injuries to the eye. In these communications eight writers recommend irrigation with a lotion of bicarbonate of soda, of which the strengths mentioned vary from 5 to 10 grains to an ounce; the A.R.P. Handbook No. 2, p. 17, advises 10 grains to a pint; and Handbook No. 3, p. 60, a 2 per cent. boric acid or a normal saline solution. Four correspondents recommend the lavage to be followed by instillation of cod-liver oil, and others that cod-liver oil or liquid paraffin be used for both early irrigation and later treatment. Another suggestion is the use of cod-liver oil with glucose. One writer points out that liquid mustard gas is soluble in water to less than 1 per cent. and its solubility in liquid paraffin

is about the same; therefore no special advantage would be gained by flushing with the oil, as had been suggested, but the statement that mustard gas "readily dissolves" in liquid paraffin also appears. Castor oil has its advocates and is mentioned as an alternative to liquid paraffin by four other writers, while dielectric oil and the necessity for freedom of the lacrimal ducts are emphasized as of importance. No bandaging of the eyes is stressed in the A.R.P. Handbooks and apparently accepted, but the writer of one letter says "keep the eyes bandaged," and after lavage suggests a treatment entirely by ointments.

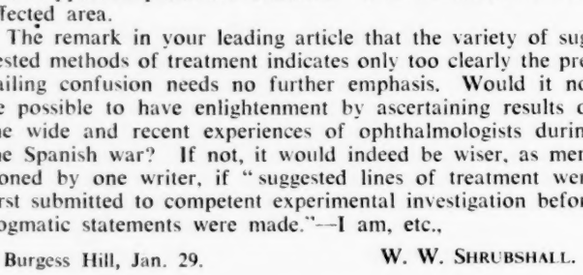
One writer whose special experience and research make his information authoritative states that mustard gas will have been washed out of the eyes by the tears before any oils can be introduced, hence apparently little is gained by using irrigation; but in the review of this subject in a leading article in the *Journal* of November 4, 1939 (p. 915) one reads, "Irrigation has some value by minimizing the possibility of a cumulative action." The writer mentioned above continues that greasy preparations for treatment of mustard-gas injuries to the *skin* have not been found useful, yet in the A.R.P. Handbook No. 3, p. 56, it is stated that "bleach ointment or other approved protective ointment" is to be rubbed on the affected area.

The remark in your leading article that the variety of suggested methods of treatment indicates only too clearly the prevailing confusion needs no further emphasis. Would it not be possible to have enlightenment by ascertaining results of the wide and recent experiences of ophthalmologists during the Spanish war? If not, it would indeed be wiser, as mentioned by one writer, if "suggested lines of treatment were first submitted to competent experimental investigation before dogmatic statements were made."—I am, etc.,

Burgess Hill, Jan. 29. W. W. SHRUBSHALL.

Extension Spring for Thomas Splint

SIR,—In the *Journal* of May 13, 1939 (p. 1014), Dr. Lionel Picton described a spring for use instead of a skewer put through the waist of the boot. This spring is better than the clove hitch but lacks the fixation action of the skewer on the bars of the Thomas splint. I have therefore had made the model spring, sketched herewith, which combines the



advantages of clip and skewer. The stronger the pull the tighter the teeth close, while the lateral extensions on the bars hold the foot rigid. The spring would have to be slipped on from the bottom of the splint.

Can someone improve on this either in simplicity or cheapness?—I am, etc.,

FREDERIC SANDERS, M.B., B.S.

Highams Park, E.4, Jan. 20.

Ear Disease in the Services

SIR,—Is sufficient attention being given in all cases to the aural condition of men joining the Services either as recruits or from the Reserve? It is possible that some may be admitted without disease being noticed, or, where it is noticed, that an accurate description of the disability is not entered in the records.

Apart from any danger to health due to the presence of aural disease under Service conditions, there is great difficulty, when the man is discharged after the war, of saying whether the disease is due to the war or, on the other hand, whether there is aggravation of pre-existing disease. I saw many such cases after the last war at Ministry of Pensions Boards without any record of their aural condition, either positive or negative, and this made assessments very difficult. As recruiting is less hurried and more careful in this war it is to be hoped that records will be more accurate. But the point is well worth stressing. Only recently I saw a young soldier from a listening post who had old-standing unilateral aural disease, which I should have thought would have made him unsuitable for that occupation.—I am, etc.,

London, W.1, Jan. 29. C. HAMBLEN-THOMAS.

Orthopaedic Specialists in the Army

SIR,—In the article on the Army Medical Services published in the *Journal* of January 27 (p. 141) Colonel E. M. Cowell states that there is immense scope for surgeons interested in orthopaedics. I have been given to understand that no such scope exists and no orthopaedic specialists have been recruited into the Army to carry out their particular specialty. The situation is different in the E.M.S., where orthopaedic surgeons are being attached to orthopaedic centres. Professor Sheen and Mr. Elmslie have already written to the *Journal* and pointed out the necessity for orthopaedic casualties to receive treatment at a special orthopaedic hospital as soon as possible, especially in view of the lessons learnt in the last war.

Surely every general hospital unit should carry an orthopaedic specialist. Under the present system limb injuries receive the most important part of treatment at the base hospitals from surgeon specialists who may have, but more likely have not had, any special fracture experience. Only when patients reach the E.M.S. hospitals in this country can they be certain of attention from orthopaedic specialists; it is quite possible that at this stage irreparable harm has already been done. If hospital units can carry ophthalmologists and oto-rhino-laryngologists, how much more important is it that every one should include an orthopaedic specialist?—I am, etc.,

Leeds, Jan. 29. GEOFFREY HYMAN.

Treatment of Varicose Ulcer

SIR,—I have followed the correspondence on this subject with much interest, but I feel that many of the writers have missed the point. They begin by mentioning that certain cases fail to do well with the modern method of treatment by means of adhesive elastic bandages, and then proceed to advocate for routine employment certain dressings or procedures which they have found successful in isolated instances. What they seem to forget is that before the introduction of the elastic adhesive bandage there was no satisfactory treatment for varicose ulcer except rest in bed.

It had been known for many years that varicose ulcers could be cured by rest in bed, and I myself believe that if rest in bed can be obtained it does not much matter what local dressing be used so long as it is free from irritating properties. But, as everybody knows, patients *will not go* to bed for the treatment of a varicose ulcer. In 1928 Dickson Wright introduced the treatment of this condition by means of elastic adhesive bandages—and there still is no better one on the market than the original elastoplast—and revolutionized the outlook for patients suffering from it. Before this method of treatment was entered upon varicose ulcer was the condition above all others which, although not immediately threatening to life, caused the greatest loss of working capacity and the most pain to the workers of this and most other countries. And it was looked upon as almost an incurable complaint. Once a varicose ulcer, always a varicose ulcer, was almost literally true. Nearly thirteen years have now elapsed since Dickson Wright started the new method, and it is difficult to estimate how many thousands of patients have been cured by its practice. Nowadays we simply do not see the huge lesions, sometimes encircling the whole limb, which were not uncommon previously. Owing to the new methods of therapy the varicose ulcer is never allowed to reach any considerable size.

Of course the elastic bandage must be used with intelligence. It is true that it has an irritating effect on some skins, and as a rule the longer it is left *in situ* the more irritating it becomes. But many patients who become seriously irritated if the bandage is left unchanged for a week (the usual time) can bear it quite well if it is changed every three days. There are some who cannot bear it even for this short time when it is applied directly to the skin. Many of these are made comfortable if the elastoplast is applied over a thin layer of ordinary open-wove bandage impregnated with Unna's paste, a paste which is actually soothing to most skins and which itself often forms a satisfactory treatment for the dermatitis which elastoplast may indeed set up.

I notice that some writers complain of the trouble and pain caused in the removal of elastoplast. This is always worse if applied to a hairy limb. The trouble and pain are minimized if the hair is removed by clippers or a safety razor before the application of the bandage. It is true that even though this be done elastoplast may adhere unduly in some cases—I cannot explain why. Should this be so, removal is greatly eased and facilitated by the use of a very few drops of benzene, which softens it in a most magical manner. This dodge does not seem to be very generally known, petrol being more often used for this purpose, but benzene is very much better.

Finally I would like to say that in my opinion the use of adhesive elastic bandage is the sheet anchor of the treatment of varicose ulcer. I have seen the wonderful change which its advent has wrought in the prospects of those who suffer from this distressing condition. It unfortunately is true that there is a small residuum of cases which cannot be treated by it, but it remains the most effective method of treatment just as the organic preparations of arsenic are the mainstay of the syphilologist even although there are occasional cases of arsenical poisoning due to them.—I am, etc.,

H. HALDIN-DAVIS,
Forest Row, Sussex, Feb. 5. M.D., F.R.C.P.

SIR,—With further reference to my letter in the *Journal* of December 16, 1939 (p. 1205), and those of Dr. J. R. A. Davies (November 25, 1939, p. 1060, and January 27, p. 147) on varicose ulcer, it appears to me that much of the correspondence from others has missed the mark by recounting their many and various methods advocated for successfully treating this condition. What both Dr. Davies and I drew attention to was our experience of one particular method and its often untoward effect—namely, the use of elastic adhesive occlusive bandages in these cases. I also pointed out that such trouble might be caused by some ingredient in these bandages, and/or the retention of broken-down tissue, and/or pus, if present. Personally I have been surprised that the question of the composition of these bandages possibly causing trouble has not been taken up by some of the well-known makers of these products. (Perhaps it is only fair to add that some years ago I went into the question of the composition of these bandages.)

Everyone knows that there are innumerable ointments, lotions, potions, concoctions, and possibly even incantations, both non-medical and medical, all with the object of curing "bad legs"; but I presume one important factor is to accomplish this without the risk of, or actually causing, another distressing skin complaint. However, in spite of our worldly and wordy armamentaria the treatment and cure of varicose ulcers is sometimes a stubborn affair.—I am, etc.,

Leicester, Jan. 28. F. A. E. SILCOCK.

The Prevention of Anxiety

SIR,—It is very interesting to read Dr. R. G. Gordon's article in the *Journal* of January 27 (p. 120) on the prevention of anxiety. Several points, however, may not meet with general acceptance.

The patient was "concussed," but "not so severe as to cause permanent organic change": this statement surely requires amendment, for we have no method of examination at our disposal which definitely excludes this contingency. Many organic changes may be present in the brain, yet clinically we may be quite unable to demonstrate their presence.

Dr. Gordon admits that there may be an inherent disposition to anxiety, but considers that much more frequently anxiety results from early experiences. It is considered by many that anxiety depends on a lack of adaptability, and that this lack is more frequently inherited than acquired. Much attention is rightly paid to upbringing and environment, but more heed should be given to organismal potentialities. Bad seeds, no matter how cared for, can never become good plants. Eugenics must in time become a matter for serious consideration. As stated, many consider the basis of anxiety to be an organismal defect, and often find that anxiety develops in persons who have not been deprived of parental love. Furthermore, it must be recognized that our very experiences are conditioned by our organismal entelechy, so that the faults must be sought for primarily in the organism. It appears to be time when medical psychologists shall regard abnormal mental reactions as defects of the organism. It really is rather useless to build up fairy tales and to neglect the foundations of the illness. When shall we cease to hear of Oedipus and Electra? When shall we realize that these "complexes" are the results and not causes of neurotic behaviour?—I am, etc.,

Aberdeen, Jan. 28. A. W. HENDRY.

Endotracheal Anaesthesia

SIR,—I am sorry to take up your space in explaining my views, which still appear to be misunderstood.

I am aware that a nasal tube can be guided into the glottis under direct vision with a laryngoscope. It was done (I think) by Phillips about 1913. I remember, too, seeing Hahn's sponge-covered tube used in 1901. Its principle is indistinguishable from the Magill tube of to-day.

What I am pleading for is the recognition of an entirely different principle of positive pressure applied at the bifurcation of the trachea through a narrow tube. This has the enormous advantage of aiding respiration while it continues, and can itself sustain efficient oxygenation in the absence of any respiratory movements. This the Magill tube cannot do, for it is too short, too fat, and the pressure inside it too small should respirations stop.

Until I am convinced that the modern method and machine will give me this overwhelming advantage, I am content to be the only surgeon in step amid the regiment of anaesthetists. —I am, etc.,

Liverpool, Feb. 3. R. E. KELLY.

SIR,—I am interested in one feature of the correspondence on endotracheal anaesthesia—namely, the possibility of conveying infection from the nose and pharynx to the trachea. Sir Harold Gillies and his associates have pointed out (*Journal*, January 13, p. 69) that such infection seldom occurs in the absence of acute upper respiratory infection. Sir Robert Kelly (January 6, p. 32) rightly mentions it as a possibility at all times, seeing that the tube must be passed through a field of organisms.

The surgeon prepares his operation site by cleanliness and antisepsis, but no one so far has mentioned that similar trouble should be taken before passing the tube. Bacteria are present on the skin of the vestibule of the nose, which could be cleaned and painted with some non-irritating antiseptic. The mucous membrane of the healthy nose is generally thought to be self-sterilizing and does not require antiseptics. Organisms are often present in the healthy pharynx which might become virulent in the trachea. These could be checked, before passage of the tube, by using some mild antiseptic to brush food debris from the teeth and to gargle the throat.

Finally, trauma by rough handling must predispose to infection here as elsewhere, and should naturally be avoided. —I am, etc.,

Truro, Feb. 4. M. R. SHERIDAN.

Obstetric Shock

SIR,—I was extremely interested to read your leading article. I am of opinion that it preaches a dangerous doctrine, inasmuch as its general trend is to encourage writers, especially of hospital reports, to use this term. I have felt for many years that in most of the so-called cases of "labour shock" the reason for the use of these words was that the doctor was unaware of the cause of death. A close analysis or a post-mortem examination in many cases would reveal an undiscovered ruptured uterus, post-partum haemorrhage, anaesthetic poisoning, or even such a condition as cardiac disease. There are some very rare examples of "labour shock," but to allow this nomenclature to creep into general usage would simply evade the issue, tend to encourage laziness in trying to elicit the actual cause of death, and harm statistical records.—I am, etc.,

Dublin, Jan. 30. BETHEL SOLOMONS.

SIR,—One hopes that your leading article on the above subject will give us all to think and make us try to reduce these deaths, which are, as you say, "a reproach to the practice of midwifery." Might it be suggested that there is often an underlying cause which renders a patient unduly susceptible to the causal factors of shock, and that this hidden cause is a suppressed fear of death in the mind of the patient?

It is said that these patients are not nervous. I wonder whether we can be sure of this. Confinements are not taken for granted now as they were in the days of large families, and one sometimes gets a revealing hint of fear from a patient in whom it would not easily have been suspected. I would submit that nervousness in the obstetric patient is often only evidenced by its interference with the pains, causing delayed labour; in such cases the inert uterus of the third stage invites the attempts to hasten expulsion which are followed by revealed shock.

Might we not ask for further recognition of the great need for reassurance of the obstetric patient by those in charge of her confinement? She is quick to sense the atmosphere of her surroundings, and, if she notices any undue haste or nervous tension in her attendants, panic may develop. A calm and matter-of-fact attitude is essential in both obstetrician and nurse; the patient must never be allowed to suspect any lurking fear in the mind of her accoucheur, but must have complete confidence in his ability to control the situation. The fluster of a nervous obstetrician may literally frighten his or her patient to death. An analogous case to that of the frightened patient, although happily a very rare one, is when the woman has no desire to live—always a formidable challenge to the skill of the obstetrician in that she is likely to develop a profound shock after delivery, except when the birth of the infant serves as a prophylactic. One sees no reason why, by the exercise of practical skill combined with psychological insight, we should not be able to reduce these deaths from obstetric shock almost to vanishing point.—I am, etc.,

Kensington, W.8, Jan. 31. VIOLET RUSSELL.

Make All Milk Safe

SIR,—The great majority of medical men are now agreed that pasteurized milk is desirable. Now, however, we are up against a very difficult problem—namely, by what means is efficient pasteurization to be obtained? From what I have seen in a large number of farmhouses visited I have come to the conclusion that the sterilization of milk bottles and the pasteurization of milk cannot be carried out efficiently by the ordinary farmer or his staff. His job should be the maintaining of good-class pastures and healthy cows. There remains, therefore, a method whereby the milk is collected in each district from the farmers and then delivered to a pasteurizing establishment, under the control of a local authority, and, after pasteurization, bottling, and finally cooling to 40° F., delivered by the staff of the former to the public. The use of insulated vans is necessary.—I am, etc.,

Torquay, Jan. 27. E. B. HAZLETON, M.D.

Why Drink Milk?

SIR,—For the infant mammal milk is the natural and ideal food, but why is it that we are the only animals that persist in drinking milk after we are (or should be) weaned?

Dr. C. O. Hawthorne and Miss Olga Nethersole (*Journal*, January 27, p. 146) have opportunely drawn attention to the risk and dangers of evacuated children contracting tuberculosis and other milk-borne diseases. Already I have operated on several adolescents for tuberculous cervical adenitis and acute miliary tuberculosis of the peritoneum—all due to drinking infected milk from uninspected cows in the country. It would be a sad commentary on our public health services to suggest that these children might have escaped infection had they previously been immunized. Why should they be allowed to contract an easily preventable disease? Apart from the 2,000 deaths which occur annually in Great Britain from bovine tuberculosis, what of those thousands of cases, crippled and disfigured for life, in our hospitals, sanatoria, and orthopaedic clinics?

Is milk a "vital food"? Surely with our present knowledge of dietetics, vitamins, food deficiencies, etc., it is quite unnecessary to drink milk—this baby food! If mother's milk is not available for the infant there are many reliable and safe substitutes, and after infancy milk should be unnecessary. Dr. G. A. Dawson (January 27, p. 146) suggests that even butter might well be replaced by tubercle-free margarine.

In a previous letter I drew attention to the possibility of infection of tubercle-free herds by a tuberculous attendant. In a recent paper Dr. W. T. Munro (*Edinb. med. J.*, 1939, **46**, 165) makes a similar observation. Why drink milk?—I am, etc.,

Dundee, Jan. 29. F. R. BROWN, O.B.E., F.R.C.S.Ed.

Diabetes and Renal Disease

SIR,—Dr. K. E. Barlow (*Journal*, January 27, p. 151) has again reopened the question of diabetes and renal disease, and credits us with the somewhat startling statement "that vomiting and ketosis lowers the *renal threshold* to sugar." He has completely misread or misunderstood what we wrote (*Journal*, November 4, 1939, p. 929)—namely, that in his second case "the slight abnormality in the *blood sugar curve* is most likely due to previous vomiting and ketosis." The italics are ours and emphasize that we are talking about different things.—We are, etc.,

The Diabetic Clinic, King's College Hospital, Feb. 1. R. D. LAWRENCE, W. G. OAKLEY.

Derris as an Insecticide

SIR,—In my small book on the louse, which you were good enough to review in your issue of January 13 (p. 54), it was suggested that the vegetable insecticides (derivatives of Pyrethrum, Derris, etc.) ought to be tested on the louse. Your reviewer doubts if that is wise, and states that there are a number of records of toxic symptoms arising in men through contact with Derris. I am not unfamiliar with some of the literature, and with the reviewer's help have looked further into the matter, and I can find no evidence that Derris used as an insecticide (for example, as a powder or spray) is harmful to the human skin. On the other hand, there is evidence in this country and in America that men who are engaged in the commercial grinding of Derris root do not suffer from dermatitis or other troubles, and that they continue at this work for long periods. I admit that if the powdered drug is inhaled it produces a feeling of numbness and a metallic taste, which passes quickly away; also that Derris is poisonous in the alimentary canal, particularly if it is dissolved in a fat or oil—a matter that hardly concerns us here.

Is it not possible that your reviewer is under a misapprehension, and that he was thinking of the internal, not external, effects of this plant? The matter has some importance, for there are circumstances under which Derris may be particularly valuable against *Pediculus*.—I am, etc.,

London School of Hygiene and Tropical Medicine, Jan. 30. P. A. BUXTON.

New Treatments

SIR,—I should like to endorse Dr. K. Hazell's opinion (January 27, p. 152) in regard to the abuse of convulsant therapy in modern mental hospital psychiatric practice. Mental treatment tends to run between such extremes as masterly inactivity, with an occasional application of the principles of psychotherapy in the form of suggestion and persuasion, to the rather drastic convulsive modes of therapy as habitually practised nowadays.

A good deal of discrimination is necessary in the choice of suitable cases for analeptic therapy.

It is axiomatic that chronic cases require drastic or prolonged measures of treatment. Nowadays accumulated negativity of many years' standing, possibly associated with feelings of misery, seems to be indicative of immediate resort to analeptics. But here again discrimination and selectivity are requisite as to the age and duration of the psychosis. Why unstabilize the adolescent further in some unwisely chosen cases?

The rather brutal motor discharge must exert a deleterious effect on the delicate cortical cellular pattern and result in bruises and scar tissue that might very well militate against the normal mental faculties of concentration, memory, etc., at such a further period after the stimulant effect of the drug or the shock of the electrical charge has worked off. Only forlorn cases of many years' standing need such drastic lines of treatment. Certain of these categories might be found in the usual floating population of mental hospital practice. Within these categories the types that do respond beneficially are the katatonic type of schizophrenia who have been mute for years: also the depressed semi-stuporose, bedridden and reduced to the vegetative level, who possibly have required tube feeding for years.—I am, etc.,

Abergavenny, Jan. 31. W. N. OWEN GEORGE.

Idiopathic Thrombophlebitis

SIR,—Two cases were reported by Dr. P. F. Meyer in the *Journal* of January 13 (p. 53). As such cases are relatively infrequent the following summary of the clinical features of one recently under observation, three separate attacks having occurred since February, 1938, may also be of interest. There has been complete freedom from symptoms and signs in the intervals.

The patient, a male aged 25 years with no previous illness, actively athletic, no history of definite injury to either leg (although he was questioned closely on this, as he had been in strenuous senior Rugby), first came under observation in February, 1938. All three attacks were afebrile throughout, and the only general signs were abdominal discomfort and a dirty tongue. The first attack affected all the superficial veins of the right leg and lasted nine weeks, during which time he was of necessity confined to bed. The veins were palpable and visible as very tender hard cords: the condition did not extend upwards beyond the knee. A firm elastoplast bandage was worn for some weeks afterwards on resuming ordinary activity. The second attack was ushered in six months subsequently by marked oedema and pain in the same leg, and when he was confined to bed veins around the knee were apparent again as thickened tender cords when the oedema went down. He stayed in bed four weeks. In September, 1939, the left saphenous vein in the middle third of the thigh became severely affected and the inguinal glands enlarged and tender; then in turn all the veins distally were involved. This time the period in bed was ten weeks. The patient is now back at work in good health. No focal infection is to be found, blood count and blood pressure are normal, Wassermann reaction is negative.

Symptomatic treatment—the usual simple anodynes by mouth and various applications locally—was necessary. In the last attack two short intensive courses of sulphapyridine were tried, but without any effect on the condition or toxic result.—I am, etc.,

Cork, Jan. 19. A. WHELTON.

Full-term Unruptured Ectopic Gestation

SIR,—Dr. L. A. P. Slinger's case reported under this heading in the *Journal* of January 20 (p. 91) has reminded me of a similar case, possibly even more rare, which I meant to publish a year ago.

This was a case of term unruptured tubal gestation, which was not operated on until the patient was two months post-mature by date. The patient was a para 2, aged 23, who had had an apparently normal pregnancy up to thirty-eight weeks. She then told her doctor that she felt the abdomen "go dead," but did not observe any diminution in the size of the tumour. The case was regarded as normal until forty-two weeks' gestation was reached, and at that time she was given two separate medical inductions, with a week's interval between them. The only result was slight blood-stained discharge per vaginam, and this continued up to the time of operation, two months later. When seen at the out-patient department for the first time on December 31, 1937, the abdomen showed a large tumour extending from the pubes to two inches above the umbilicus. The tumour was rather narrow, very firm, resembling a fibroid in consistency, and very fixed. On bimanual examination there was a soft patulous cervix lying completely behind the tumour, and it was impossible to say definitely whether or not it was in continuity with it without an *x*-ray examination. The diagnosis lay between (1) post-mature ectopic pregnancy with dead foetus, (2) intra-uterine dead foetus, (3) uterine fibroid. The very strong history from the patient's doctor and nurse swayed the diagnosis towards pregnancy with complications. The curious history of sudden abdominal collapse and lack of anything pointing to rupture of membranes argued against uterine pregnancy and hinted at the possibility of extra-uterine gestation. The pregnancy was at once confirmed by *x*-ray photograph, the foetus being coiled up in such a manner as to clinch the diagnosis of foetal death.

Operation was performed on January 5, 1938. The tumour was adherent to the anterior abdominal wall in the middle line, but when this was easily freed it was eventrated entirely as easily as the common pedunculated ovarian cyst. It was then seen that the tumour was connected to a normal uterus (possibly very slightly enlarged) by about two inches of healthy right Fallopian tube, and about four inches of the fimbriated end of the same tube emerged from the opposite side of the tumour. Apart from the ovarian pedicle and an unhealthy-looking, but completely free, right ovary, the tumour had no attachments other than normal, expanded, broad ligament. The complete tumour, a small portion of the uterine end of the tube, and the right ovary were easily removed in one mass. The complete specimen was handed over to the Royal College of Obstetricians and Gynaecologists, and can now, after suitable preparation, be seen in the museum.

N.B.—It has been suggested to me by one or two well-known obstetricians that this must have been a case of pregnancy in a rudimentary horn, but this was absolutely negatived by the normal uterus, together with tubes and round ligaments, seen and carefully drawn at the time of operation.—I am, etc.,

DOUGLAS A. MITCHELL, M.D., F.R.C.S.Ed., M.R.C.O.G.

Royal United Hospital, Bath, Jan. 26.

Plea for the Metric System

SIR,—I should like to offer humble support to Dr. M. E. Lampard's plea for the metric system (*Journal*, January 6, p. 36). Medicine claims to be a scientific and enlightened profession, and yet we in this country cling to a system of dosage which is relatively much more antiquated and cumbersome than the carbolic acid spray or the single stethoscope. The trouble lies in the medical schools. One hears a narrow-minded teacher sneer unmercifully at a student who has quoted a metric dose, and at the very next bed, without shame, the scoffer himself prescribes sulphanilamide in grammes or so many litres per minute of oxygen for a cyanosed patient.

Logical behaviour is expected of rational and civilized human beings. In order to comply with this criterion

devotees of the imperial system of dosage should use the following constants, among many others:

Normal red blood cell count = 296,000,000 (appr.) per minim.
Vital capacity = about 20 fluid ounces less than a gallon.
1 calorie = the amount of heat required to raise one fluid drachm of water through 57/100 of a degree Fahrenheit.
An average dietary requirement per day is about 3,300,000 times the above amount.

The absurdly cumbrous nature of the imperial system is well illustrated by a problem such as this:

If a drug *x* is administered in a dosage of 20 grains per pound of body weight per week, and if the price of the drug is 1d. per ounce (avoirdupois), what is the cost of one month's treatment for a patient weighing 10 stone? (The answer is 2s. 1½d., I think.)

The imperial system is homely and has certain advantages (it minimizes fractional doses, for example). But ells and leagues and talents and cubits were doubtless familiar and convenient in their day, yet they have been superseded. I suggest that medical students, instead of being actively discouraged from using the metric system, should be encouraged to do so.—I am, etc.,

Taplow, Bucks, Jan. 30. E. G. TURNER.

Resistance to Cold

SIR,—Many of your readers, who are perhaps not quite as strong as they used to be and cannot take much exercise, must have found it difficult to resist severe and long-continued cold. Circulation seems to flag first in the extremities, and hence the value of winter mittens and anklets and, for sedentary people, of keeping the feet above floor level. Another means which I can recommend for rapidly stimulating the entire circulation and so avoiding chill is a very hot footbath, keeping up the temperature to the limit of toleration for ten minutes. The magnificent Finns go one better. Their vapour bath at 120° F. or over with switching is followed by plunging in cold water or snow. This is "contrast thermal treatment" in its extremest form—a whip, first to the circulation and then to metabolism. Heat alone makes weaklings, but which of us can equal the resistance to cold of the Finns?—I am, etc.,

Feb. 4. R. FORTESCUE FOX.

Medico-Legal

A MOSQUITO BITE AS AN ACCIDENT

A workman is entitled to compensation for injury by accident arising out of and in the course of his employment. The question of when an accident fulfils these conditions has been asked on innumerable occasions, and many of the answers have found their way into the legal reports. There must be a certain degree of causal relation between the accident and the employment. Even if the risk is common to all mankind the accident may still have arisen out of the employment. When, however, a workman is killed by earthquake, lightning, or some other force of Nature, his dependants have to show that he was specially exposed to the accident by reason of his employment. Another line of cases deals with the position when a workman contracts an illness at work. An old decision called Turvey *v.* Brintons laid down that the entry of anthrax infection into a man's system while he was handling wool in the course of his employment was an accident entitling him to compensation, and later cases have followed the same principle. Many industrial diseases are treated as accidents by the Workmen's Compensation Act, 1925. A case involving both these principles was decided by the House of Lords at the end of last year.[1]

[1] Dover Navigation Company Ltd. *v.* Craig. *Times*, December 14, 1939.

The ship *Sea Rambler* made a voyage to South Africa in 1936, in the course of which thirteen of the crew became ill after being bitten by mosquitos. The nature of the illness was not quite certain, but the county court judge who heard an application from the mother of one of them, a widow, for workmen's compensation found it was either malaria or yellow fever or both. Finding that the sailor underwent a risk common to all in the neighbourhood, his Honour considered himself bound by the authorities to hold that the mother had not proved that the accident arose out of the employment. The Court of Appeal reversed his decision, because the sailor had been ordered to go with his ship into a place which the learned judge found to be a place of peril.

The shipowners appealed to the House of Lords, and Viscount Maugham said that it was clearly impossible to hold that all illnesses and diseases contracted by a workman in the course of his employment are accidents arising out of it. If, however, it can be shown that he was especially exposed by reason of his employment to the risk of infection by disease-bearing bacteria, then the illness is due to an accident arising out of the employment. The *Sea Rambler* was one of the most dangerous places in the world when the crew were exposed to the risk of being bitten by day-flying mosquitos which had themselves bitten sufferers from yellow fever. Lord Maugham did not think it relevant that all other persons in the same area were subjected to the risk. It was sufficient that the seaman Craig was especially exposed by reason of his employment to the risk of yellow fever. That fact was evidence of a sufficient causal relation between the illness and the employment to say that the one was contracted in the course of the other.

Obituary

PROFESSOR DE QUERVAIN

Dr. Fritz de Quervain, emeritus professor of surgery in the Berne Faculty of Medicine and author of works on surgical diagnosis and goitre which have been translated into English, died at the age of 72 on January 24. He was elected an honorary Fellow of the Royal Society of Medicine in 1926 and a Foreign Corresponding Member of the British Medical Association in 1932.

Mr. H. S. SOUTTAR, Chairman of Council of the British Medical Association, writes:

Fritz de Quervain, professor of clinical surgery at the University of Berne, was not only the most distinguished surgeon in Switzerland but had achieved a world-wide reputation in his art. A student of Berne, he assisted Kocher in much of his early work on the thyroid gland and was awarded the Haller Medal in 1899. He ultimately followed Kocher as professor of surgery in Berne and, continuing to develop his work, became one of the greatest authorities on the surgery of the thyroid, the development of which owes much to his original researches. His surgical interests were, however, very wide, and his book on surgical diagnosis, profusely illustrated from his own experience, has been translated into many languages. In the International Congress of Surgery he took a leading part, and he was president of the congress at its meeting at Madrid in 1932.

Only those who had the privilege of knowing de Quervain personally can appreciate the sterling worth of his character. The least assuming of men, it was with difficulty that one realized his profound knowledge of surgery, which resulted from a life devoted to the most painstaking and honest research. One could always be sure that any statement made by de Quervain rested not only on unrivalled experience but on the most accurate and

critical observation. His powers as a teacher were quite exceptional and were illuminated by a sense of humour which could carry his audience through the driest and most difficult subject. To those of us who knew him as a friend he leaves behind the memory of a very great privilege and the inspiration of great achievement.

FREDERICK NAYLOR STEWART, D.S.O., M.C., M.D.Ed.

We regret to announce the death on January 19 of Dr. F. N. Stewart, a well-known practitioner in Hull.

Frederick Naylor Stewart qualified in 1888, took the M.B., C.M. in 1889, and proceeded to the M.D.Ed. in 1898. He was house-physician and house-surgeon at the Royal Infirmary, Glasgow, and outdoor house-surgeon at the Glasgow Maternity Hospital. A colleague (T. R. R.) writes: "F. N." to his contemporaries stood for all that is best in medical practice. Unpretentious and retiring to a degree, he took little part in medical meetings and other corporate activities of the profession, yet he was regarded by all his colleagues with an affection and esteem such as is seldom accorded. Between him and his patients the relationship was what one expects to find occasionally in country or country-town practice but seldom in a large city. He was counsellor and friend in every household, whether poor or well-to-do. Only a man of exceptional personality could have maintained this kind of service, as his practice was very large—at one time he was doing as many as 360 obstetric cases in a year. Stewart no doubt inherited or learned his high ideals of medical work from his father, who for many years carried on a large practice in Newport, Fife, where he was succeeded in the same traditions by his elder son, who died a year ago. When the last war broke out Stewart had reached his fiftieth year, but nothing would keep him from offering for foreign service, and eventually in 1915 he was granted a commission. His ambition was to be as near the front line as possible, and as a battalion medical officer he served till the end of the war. Many stories filtered through to his friends showing the affection in which he was held by officers and men alike. He was badly wounded, and was awarded the D.S.O. and M.C., honours which he no doubt prized very highly but of which he never spoke. His health was never good after the war, and he retired ten years ago after forty years' practice in Hull. He had been a member of the British Medical Association for thirty-seven years. His wife predeceased him by three years, and of his four sons three are now serving in the Army.

FRANCIS VILLY, M.D.

By the death on January 14 of Dr. Villy at Milligan House, Keighley, Yorks, the town has lost one of its oldest practitioners, as he had been in practice there for about forty years. Francis Villy was born at Manchester in 1869, and graduated B.A. in 1892 at Cambridge, taking first-class honours in both parts of the Natural Sciences Tripos; he was Foundation Scholar, Exhibitioner, and Hutchinson Research Student at St. John's College. He studied medicine in Cambridge and at Owens College, Manchester, taking his M.B. in 1896 and proceeding to the M.D. in 1899. Thereafter he was house-physician at Addenbrooke's Hospital, house-physician at the Royal Infirmary, Manchester, and assistant medical officer at the Manchester Hospital for Consumption. Among his publications were articles on the anatomy and development of the ear in the common frog (*Quart. J. microsc. Soc.*, 1890), an uncommon form of tumour of the thyroid body (*J. Path. Bact.*, 1896), and on vomiting and cardiac failure in connexion with diphtheria (*Med. Chron.*, 1899). For many years Dr. Villy was medical officer to the Keighley Board of Guardians at the Oakworth Road Institution and St. John's Hospital, and he was public vaccinator for twenty-six years. At the Keighley and District Victoria Hospital he was senior honorary physician until 1932, when he retired and was appointed to the consulting staff of the hospital. During the war of 1914–18 Dr. Villy did important work at St. John's Hospital, which was then equipped for dealing with wounded soldiers, and he was held in high esteem by the nursing staff and patients. He held the position of medical officer to the local branch of the N.S.P.C.C.

By Dr. Villy's death Yorkshire has lost a noted and eminent archaeological expert. For more than thirty years he had done an outstanding work in researches into Roman remains in Yorkshire. In recognition of this work he was elected in 1938 a vice-president of the Bradford Historical and Antiquarian Society. He had been greatly interested in eliminating the mysteries of sites at Sutton-in-Craven, slag heaps on Rombalds Moor and Harden, a site at Elslack-in-Craven, Roman forts at Long Preston, and traces of Roman occupation in the Spen Valley; he had written widely on the subject, and in 1938 contributed his final article on "The Craven Way," in which he presented many hitherto unknown facts of an important road through Wharfedale used during the Roman occupation.

Dr. Villy was one of the old family physicians now disappearing rapidly from the profession, and although he never took up any public work apart from his profession he was keenly interested in local and national affairs: he recently contributed to the Press suggestions for dealing with magnetic mines. Dr. Villy was a sound clinician and noted antiquary, a man of high ideals and simple tastes, who loved the Yorkshire dales and moors, who knew them in all their moods and with an intimacy that few can have equailed. He leaves a widow and two daughters.

R. H. W. DUNDERDALE, M.B.E., M.R.C.S., J.P.

With the passing of Dr. R. H. W. Dunderdale on January 20, at the age of 72, the medical profession of Blackpool and the Fylde has lost one of its best-known and most-loved members; a link with an earlier generation has gone.

Robert Harold Webster Dunderdale belonged to a Blackpool family, and devoted his entire life to the service of his native town. He received his medical education at the Liverpool school at a time when many of its teachers had a more intimate contact with family practice than is usual in the circumstances of later days; and the imprint of this element in his training was permanent. He qualified M.R.C.S., L.R.C.P. in 1892. When meeting him in consultation it was never possible to escape the consciousness of his personal interest, whether in private work or in hospital; his concern was with patients and never with cases, an attitude which happily is increasingly appreciated but is seldom found so complete and so innate. He early became a member of the surgical staff of the Victoria Hospital, of which in course of time he became senior surgeon; and on his retirement from the active staff in 1935 he was appointed consulting surgeon. Other appointments which he held were those of surgeon to the borough police force and to the fire services, and he was also a J.P. of the county borough. He was an enthusiastic mason, and a P.Pr.G.W.

of West Lancashire. During the great war, when Blackpool was an important centre of military training, he took a leading part in the organization of a series of emergency hospitals, which were grouped around the Victoria Hospital as clinical centre. These services were later recognized in the conferment upon him of the honour of M.B.E. He joined the British Medical Association in 1893 and was one of the oldest members of the Blackpool Division, of which he was chairman in 1908 and honorary secretary in 1909; he was also chairman and one of the founders of the Fylde Medical Society, a society which did not survive the stresses and interruptions of the war, but which had been in pre-war days a prominent feature of the medical life of the district.

If it is possible to single out a characteristic from the many that went to make a man who won the hearts of all who knew him, it was his consistent and infectious cheerfulness, whether in times of ease or of trial. No one in perplexity or in trouble could meet him without feeling brightened and encouraged; he was able to see beyond the shadows. In the many references that have been made to the loss which our town has sustained the expression "Beloved Physician" has recurred; and it is fitting.

Dr. Dunderdale is survived by a widow and three daughters, one of whom is the wife of his successor, and for all of them much sympathy is felt.

E. M. E.

R. HENSLOWE WELLINGTON, M.R.C.S.

The death at St. Leonards-on-Sea on January 23 of Dr. Richard Henslowe Wellington removes a man who was in his time an outstanding authority on medical jurisprudence and especially on the law relating to coroners. Dr. Wellington, who was seventy-eight years of age, received his medical training at St. Bartholomew's and qualified in 1891. For a time he held appointments as medical officer of health to the Wisbech (Cambridgeshire) Port Sanitary Authority and the Sutton Bridge Urban District Council. But his real field was forensic medicine, on which subject he was lecturer at Westminster Hospital Medical School. He became a barrister-at-law, being called at the Middle Temple, and with others he founded the Medico-Legal Society, was for many years the editor of its *Transactions*, and a corresponding member of the similar societies in New York and in France. He held the deputy coronership of "the City and Liberty of Westminster and the Savoy" and the south-western district of London. On the office of coroner he wrote with great authority. In 1905 two volumes came from his pen entitled *The King's Coroner; being a Complete Collection of the Duties relating to the Office*, to which he appended a short history. He was also responsible for the considerable section, amounting to a book in itself, headed "Medicine and Pharmacy" in the twentieth volume of Halsbury's *Laws of England*, published in 1911. Dr. Wellington was a member of the British Medical Association for many years, having joined it as soon as he was qualified, and he served as representative at the Annual Meeeting at Oxford in 1904. During his retirement he lived at Hindhead in Surrey.

GEORGE HENRY TEMPLE, M.B., C.M.

By the death on January 24, at the age of 75, of George Temple, Weston-super-Mare and the surrounding district have lost a much loved and respected friend as well as an outstanding surgeon. A bachelor, generous and kind-hearted, he was full of vitality almost to the day of his death. George, with his wonderful dexterity and keenness of mind, was for thirty-five years the soul of the hospital for which he worked so unceasingly and untiringly.

Educated at Repton, he took his medical degrees at Edinburgh in 1888. He became house-surgeon to the Weston-super-Mare Hospital in 1895, and in 1897 set up in practice in the town and almost at once obtained the posts of Poor Law and Police Court medical officer. In 1905 he was appointed as surgeon to the hospital, and he remained on the active staff until his death. He died after a few days' illness in the hospital he had loved and served so long and faithfully. As a younger man he was a very keen tennis player, an excellent shot, and interested in amateur theatricals, in which he took an active part. A wonderful billiards and snooker player, he held his position as one of the best players in the town almost until the time of his death. For thirty-six years George Temple was chief officer of the fire brigade, and only relinquished the post at the outbreak of the present war, when the appointment of a whole-time officer became necessary. At his funeral the coffin was carried on the fire engine, and the brigade formed a guard of honour.

He became a member of the B.M.A. in 1888 and was chairman of the East Somerset Division in 1933–4, and a member of the present Local Medical War Committee. He will long be mourned and missed by the many he helped, directly and indirectly, and many a young practitioner has benefited by his kindly criticism and advice.

P. S. M.

Dr. ALEXANDER DEY—Dey of Wooler—died on January 7 (writes Professor Grey Turner), and his passing, at 85 years of age, leaves us bereft of the grand old man among the rural practitioners of North Northumberland. A native of Tomintoul in Banffshire, he was educated at Aberdeen University, where he graduated in 1881. Very soon afterwards he came to Wooler, that delightful little town nestling at the eastern end of the Cheviots. For some years he was assistant, and then partner, with the late Dr. Walker, but for the past many years he had been the undisputed doyen of the district, and no single person was better known or respected. In public affairs he had a fine record, and it was only last year, on his retirement from the position of medical officer of health to the Glendale Rural District Council after a service of forty years, that his friends of that body presented him with a silver salver as a token of their esteem and regard. In a similar way he was for long years Poor Law medical officer, surgeon to the Glendale Dispensary, surgeon to the police, etc. In other ways he was identified with the activities and well-being of the town, and during the last war he was in charge of two V.A.D. hospitals, and was awarded the M.B.E. for his services. But it is as the trusted medical adviser of large numbers of country folk in all walks and stations that he will best be remembered. When he first went to Wooler the Alnwick and Cornhill railway had not been completed, and yet he lived to see the line outlive its usefulness and be closed to passenger traffic as the result of the increasing use of the ubiquitous motor. In his earlier days in practice it was a question of either horseback, the gig, or Shanks's pony, and each of these methods had to be requisitioned on some of the hill journeys that Dey was called upon to make. Many a time, in mid-winter as well as high summer, and both by night as well as day, he had to make long journeys up the burns to shepherds' cottages to places as remote as Goldscleugh or Blakehope or Alnham Moor, and rare were the recollections he had to tell of those professional visits. But when the time came he was keen on his motor cars, and was one of the earliest country doctors to take to that form of locomotion. Although he never drove himself he was much interested in his cars, and took a personal pride in their performance. Dey was a very sound practitioner: he had a judicial mind and could give a really lucid account of the history of his cases and of the attendant circumstances. He had a rare memory and was a good corre-

spondent, and wrote a capital letter. Always inclinable to associate with the younger members of the profession, it was in this way that he kept himself up to date, and he was always eager to bring the latest discovery into practice for the benefit of his patients. What a delight it was to make long country journeys in his company, and how pleasantly the time passed, for he knew the life-story of so many of the folk and the history and romance with which they were surrounded. Though Dey was absorbed in his work he found time to take an interest in his garden and in the affairs of the golf club. He was wonderfully vigorous, and was at work until quite recently. He not only dressed well, but he liked other people to be well dressed, and he thoroughly enjoyed an occasional social function even if it meant a very long journey to get back home in the dead of night. He will for long be thought of in the Wooler district, and many who pass that way will remember it best because of the recollection of his outstanding personality. Dr. Dey was twice married, and is survived by a widow, a daughter, and four sons.

Dr. KATHARINE ROSEBERY DRINKWATER, who died at the end of December, had been chairman of the Denbigh and Flint Division of the British Medical Association in 1927–9 and president of the Wrexham and District Clinical Society in 1937–8. She was born in 1872, the eldest daughter of H. Mason Jay, M.D., F.R.C.S., and from Bath High School went to Bedford College, London, and the London School of Medicine for Women. She qualified as L.S.A. in 1903 after obtaining the B.Sc.Lond. in 1896, and graduated M.B., B.S. in 1906, afterwards taking the D.P.H. of Liverpool. In 1906 she married the late Dr. Harry Drinkwater of Wrexham as his second wife. From 1907 onwards she was assistant school medical officer under the Wrexham Education Committee and medical inspector of children under the Denbigh County Council. During the last war she was medical officer in charge of the women's wards in the Military Families Hospital at Malta for over a year. Dr. Katharine Drinkwater did much public work in North Wales, in social service and on the magistrates' bench.

Dr. ERNEST CHARLES YOUNG, a past-president of the Hunterian Society of London and of the Chelsea Clinical Society, died on January 6 at the age of 65. He had studied medicine at St. Mary's Hospital and Newcastle-upon-Tyne, and graduated M.B. of the University of Durham in 1905 after gaining honours in anatomy and physiology and materia medica. He was awarded the gold medal for his M.D. thesis on atonic dilatation of the stomach. When he settled in practice in London Ernest Young became clinical assistant to the West End Hospital for Nervous Diseases and to the North-West London Hospital, and was later elected physician to the Farringdon General Dispensary and physician to the Princess Beatrice Hospital. During the last war he served as senior physician to the McCall Hospital for Officers, and was mentioned in dispatches. He had a large private practice, and never spared himself in the interests of his patients.

Mr. WILLIAM LEES, who died at Chester on January 11, aged 77, was for many years a familiar figure in Cheshire and North Wales. After studying medicine at University College Hospital he qualified as L.S.A. in 1884 and M.R.C.S. in the following year. He spent several years in travel, and on returning to England was appointed house-surgeon to the Chester Infirmary, then a hospital of eighty beds; he was later elected to the visiting staff. Soon afterwards he became medical officer of the Cheshire Race Meeting, and until the time of his retirement in 1933 regularly attended the Chester races and brought the ambulance arrangements to a high standard of efficiency. In the opinion of a good judge, Mr. Frank Romer, chief surgeon to the Jockey Club, the ambulance equipment and administration at Chester were second to none in the country. Dr. Lees was also responsible for the whole of the ambulance arrangements at the investiture of the Prince of Wales at Caernarvon Castle. He was a member of the Chester Council for six years, and though offered the Shrievalty and later the Mayoralty he could not accept owing to the claims of a large practice. He was a member of the British Medical Association for many years after joining it in 1887, and had been president of the Chester and North Wales Medical Society. He was an honorary life member of the St. John Ambulance Association.

We regret to announce the death on January 21 from bronchopneumonia of Dr. HAROLD CARTER at the early age of 38. A native of Hyde in Cheshire, he was educated at Blackham Grammar School and the University of Edinburgh, and graduated M.B., Ch.B. in 1923; he later obtained the diplomas of F.R.C.S.Ed. and M.R.C.O.G. After serving as senior house-surgeon at the Leicester Royal Infirmary, Dr. Carter was for a short time in the L.C.C. Hospitals Service as a deputy superintendent, and was then appointed medical superintendent of the Mill Road Infirmary, Liverpool. His administrative ability was recognized by transference to the post of medical superintendent of the Central Middlesex County Hospital, an institution with 910 beds, and his standing in the eyes of his colleagues by election as chairman of the Willesden Division of the British Medical Association in 1937.

Mr. WILLIAM HENRY KELSON, who died in retirement on January 24 in his seventy-eighth year, was formerly well known in laryngological circles, having been for many years surgeon to the Throat Hospital, Golden Square. He was educated at Gresham's School, Holt, and at the London Hospital, where, after qualifying in 1883, he served as house-physician. In 1889 he graduated M.B.Lond., took the M.D. in the following year, and the B.S. (with honours) and the F.R.C.S. in 1893. After a few years in psychiatry he began to specialize in diseases of the throat, nose, and ear, and was elected to the staff of the Golden Square Hospital. Mr. Kelson published a book on his specialty, and had been honorary secretary and vice-president of the Otological Section of the Royal Society of Medicine and honorary secretary and president of the Laryngological Section. He was a member of the British Medical Association for nearly the whole of his professional life.

The Services

NAVAL COMPASSIONATE FUND

At the quarterly meeting of the directors of the Naval Medical Compassionate Fund, held on January 26, Surgeon Vice-Admiral Sir Percival Nicholls, K.C.B., K.H.P., Medical Director-General of the Navy, in the chair, the sum of £116 10s. was distributed among the several applicants.

CASUALTIES IN THE MEDICAL SERVICES

ROYAL ARMY MEDICAL CORPS

On January 30 was published a list of officers of the Army and Royal Air Force who had died on service since the beginning of the war. It contained the names of six medical officers—namely, Lieutenant-Colonel William Leonard Eliot Reynolds, M.C., Lieutenant Arnold Norman Fletcher Critchley, Lieutenant Archibald Edgar Hill, Lieutenant Ivor Lloyd, Captain Geoffrey Henty Saunders, and Acting Major Thomas Fraser Todd. The death of Lieutenant-Colonel Reynolds was recorded in the *Journal* of December 9, 1939 (p. 1168), and those of Lieutenant Critchley and Acting Major Todd in the *Journal* of December 16, 1939 (p. 1209).

Lieutenant ARCHIBALD EDGAR HILL was elected a member of the British Medical Association in 1926, and was president of the Griqualand West Branch in 1934. Lieutenant IVOR LLOYD qualified M.B., Ch.B. of the University of Liverpool in 1922. Captain GEOFFREY HENTY SAUNDERS took the M.R.C.S., L.R.C.P. in 1934, and had held a short service commission in the Royal Army Medical Corps since 1937, being promoted captain in the following year.

DEATHS IN THE SERVICES

COLONEL SIR CHARLES BRIERLEY

Colonel Sir Charles Isherwood Brierley, C.I.E., I.M.S. (ret.), died of acute bronchitis at Leckhampton, Cheltenham, on January 25, aged 60. He was born on March 24, 1879, the son of the late Prebendary J. H. Brierley, was educated at Leeds, and took the M.R.C.S., L.R.C.P. in 1901. He at once

went to South Africa as a civil surgeon and served with the Imperial Light Horse from November, 1901, to November, 1902, took part in operations in the Transvaal, Orange River Colony, and Cape Colony, and received the Queen's medal with five clasps. Entering the Indian Medical Service as lieutenant on August 31, 1903, he became colonel on February 17, 1933, and retired on March 4, 1936. He received the C.I.E. on March 1, 1929, and a knighthood on January 1, 1936. Almost all his service was spent on the North-West Frontier, where he was agency surgeon at Wana in Waziristan in 1907, and in the Khyber Pass in 1908. He was then appointed civil surgeon of Peshawar, where he built and administered the Lady Reading Hospital. In 1927 he was appointed chief medical officer of the North-West Frontier Province and later inspector-general of hospitals in that province. He served in various frontier expeditions during the war of 1914–21, including the third Afghan War, when he was mentioned in dispatches. He married his cousin, Zoë Brierley, and leaves a widow, a son, and a daughter.

Surgeon Rear-Admiral FREDERICK WILLIAM PARKER, O.B.E., R.N. (ret.), died at Southsea on January 8. He was educated at St. George's Hospital and took the M.R.C.S., L.R.C.P. in 1887. Entering the Royal Navy he reached the rank of surgeon captain on September 12, 1917, and retired as surgeon rear-admiral on March 30, 1922. He served through the war of 1914–18, receiving the medals and the O.B.E. in 1919. He had been a member of the British Medical Association for thirty-seven years.

Fleet Surgeon ALEXANDER RICHARD JOYCE, R.N. (ret.), died at Henley-on-Thames on January 23, aged 91. He took the L.R.C.P.I. and L.M. and L.R.C.S.I. in 1870 and, entering the Royal Navy soon afterwards, became fleet surgeon on October 27, 1891. He served in the Egyptian War of 1882 as surgeon of H.M.S. *Superb*, when he was present at the bombardment of Alexandria and landed in medical charge of a force at Ramleh Heights. He was severely wounded in the Alexandria riots. He received the Egyptian medal with clasp and the Khedive's bronze star.

Surgeon Captain PALMER DEVOY RAMSAY, R.N. (ret.), died at Plymouth on January 30. He was the son of the late Paymaster-in-Chief Andrew John Ramsay, R.N., was educated at St. Mary's Hospital, and took the M.R.C.S., L.R.C.P. in 1903. Entering the Royal Navy, he attained the rank of surgeon commander on March 1, 1917, and retired with the rank of surgeon captain on April 19, 1935. He served during the war of 1914–18, receiving the medals. His sister is Dr. Mabel L. Ramsay of Plymouth.

Colonel NICHOLAS TYACKE, late R.A.M.C., died at Weymouth on January 11, aged 73. He was born at Constantine, Cornwall, on March 22, 1866, was educated at Middlesex Hospital, and took the M.R.C.S., L.R.C.P. in 1888. He entered the army as lieutenant on January 30, 1892, and reached the rank of lieutenant-colonel on April 21, 1914. During most of the war of 1914–18 he served as assistant director of medical services of a division in France and Flanders, with the rank of colonel, received a brevet colonelcy on June 3, 1919, became full colonel on March 22, 1921, and retired the same day. He served in the campaign on the North-West Frontier of India in 1897–8, receiving the Frontier medal with a clasp; and throughout the South African War of 1899–1902, when he took part in the relief of Ladysmith, including the actions at Spion Kop, Vaal Krautz, Tugela Heights, and Picter's Hill, and in operations in Natal, including the action at Laing's Nek, and in the Transvaal, was mentioned in dispatches and received the Queen's medal with five clasps and the King's medal with two clasps. In the war of 1914–18 he was also mentioned in dispatches. He had been a member of the British Medical Association for forty-four years.

Lieutenant-Colonel FRANCIS HENRY MERCERON BURTON, R.A.M.C. (ret.), died suddenly at Finchley on January 10, aged 80. He was born on April 20, 1859, took the M.R.C.S. in 1880, the M.B., M.S. of the University of Durham in 1881, and proceeded M.D. in 1890. He entered the army as surgeon on February 4, 1882, became lieutenant-colonel after twenty years' service, and retired on April 20, 1912. He served in the Burma campaign of 1885–7, receiving the Indian Frontier medal with a clasp; and throughout the South African War of 1899–1902, when he took part in operations in Cape Colony, in the Orange River Colony, and in the Transvaal, receiving the Queen's medal with three clasps and the King's medal with two clasps. He rejoined for service in the war of 1914–18 from December 28, 1914. He had been a member of the British Medical Association for thirty-three years.

Universities and Colleges

UNIVERSITY OF LONDON

The last date for obtaining the entry form for the examination for the Postgraduate Diploma in Psychological Medicine, March–April, 1940, is February 24; entry closes on March 1, and the examination begins on March 26 (Part A) and April 9 (Part B). Entry forms may be obtained from the University Extension Registrar, University of London, at Royal Holloway College, Englefield Green, Surrey.

UNIVERSITY OF MANCHESTER

Professor F. Wood Jones, F.R.S., has withdrawn his resignation of the Chair of Anatomy which was to have taken effect from December 25, 1939. Dr. J. C. Dundon has been appointed Demonstrator in Anatomy from December 25, 1939.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

A quarterly meeting of the Council was held at the College House on January 27, with the Vice-President, Professor Miles H. Phillips, in the chair.

Membership

The following were admitted to the Membership of the College, *in absentia*:

Charles Victor Salisbury (Sydney), Ebenezer A. Thomas (Vellore, India).

The following candidates were elected to the Membership of the College:

Hugh Sylvester McLelland (Brisbane, Australia), Clifford William Furneaux Burnett (Southend), James Alexander Chalmers (Royal Air Force), Alexander Culiner (Canada), Samuel Davidson (Birmingham), Arthur Leonard Deacon (London), Malcolm T. Drummond (Sydney), Ronald Eadie (Crieff), Alice Barbara Field (London), Herbert John Green (Perth), Henry Alexander Hamilton (London), Nora Louisa Keevil (London), David Ronald Kilgour (London), Oswald Lloyd (London), Robinson M. Millen (London), Robert C. Percival (London), Evan Robert Rees (Harrow), Harold Mitchell Rees (Sydney), Jane B. Roy (Dundee), Charles Scott Russell (Oxford), George Routledge Turner (Southend), Phillip Neville Simons (Sydney, R.A.N.V.R.).

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—A. A. M. Easton, G. E. H. Enderby, R. H. Gaman, J. N. Hunt, N. W. R. Lucas, J. P. Rochford, H. Wormald.

MEDICINE.—E. Batley, M. G. Braham, C. Bucknall, W. Gordon, N. W. R. Lucas, A. M. McCall, H. Wormald.

FORENSIC MEDICINE.—E. Batley, M. G. Braham, C. Bucknall, W. Gordon, N. W. R. Lucas, A. M. McCall, H. Wormald.

MIDWIFERY.—D. McC. Gregg, G. T. Hammond, G. H. Miles, H. Wormald.

The diploma of the Society has been granted to E. Batley, M. G. Braham, R. H. Gaman, J. N. Hunt, N. W. R. Lucas, A. M. McCall, and H. Wormald.

CONJOINT BOARD IN SCOTLAND

The following candidates, having passed the requisite examinations, have been admitted L.R.C.P.Ed., L.R.C.S.Ed., L.R.F.P. and S.Glas.:

J. Allan, R. Anderson, J. Balkind, S. Barclay, J. C. Brown, G. Buchanan, J. Cinder, H. I. Clapham, A. C. Clark, R. F. Clark, S. Druce, G. K. Effat, D. M. Fairley, C. Fraser, S. A.-M. Gabrial, P. Goldberg, L. Goldstein, W. R. Grant, J. H. Higgins, J. E. Holland, H. W. Horne, K. G. Huxham, B. Jacobs, M. M. Katz, J. D. Katzman, P. L. Khurana, G. B. Lamberty, D. K. Levin, B. R. Malhotra, A. A. Martin, P. G. Miller, K. Misch, M. A. L. Musa, A. M. McKinlay, A. Newman, V. O. Nurse, F. G. Obeidallah, D. A. Patel, T. M. Prossor, H. J. Richardson, G. Richmond, L. K. Rittenhouse, Doreen M. Sang, L. E. Shapiro, J. B. Stafford, W. D. T. Sym, H. Q. O. Wheeler, A. R. Widlitz.

The following graduates of recognized foreign universities were also admitted Licentiates:

M. Bodian, B. C. Bose, Dorian Eisenklam, K. Eisinger, E. B. Gold, S. Horowitz, G. Maschanzker, K. F. Pollaczek, Josefine Stross, M. Sugar.

Medical Notes in Parliament

In the House of Commons on February 6 Mr. W. S. MORRISON announced that the rationing of butcher's meat will begin on March 11, on a value basis at the rate of 1s. 10d. weekly for each person over 6 years and half that amount for each child under 6. Edible offals will be free of the ration. Restaurants, industrial, school, and other canteens, and all other catering establishments, including hospitals, will be permitted to serve meat meals without coupons, but will be restricted to a proportion of their normal requirements of butcher's meat.

A discussion on food prices was arranged for February 8 in the House of Commons.

On February 1 the Parliamentary Medical Committee met at the House of Commons Dr. Morris Wright, Dr. Howard Greaves, and Dr. Wilson of the Tavistock Clinic for a discussion on the treatment of psychological cases in the Army. Subsequently the views of the deputation were put before the Ministry of Pensions and the Army medical authorities.

Vaccination in the Army

On January 30 Mr. OLIVER STANLEY told Mr. Leach that the War Office was receiving information regarding illness among the troops in Great Britain, Ireland, and the Channel Islands. The percentage of men who required treatment in hospital as a result of vaccination for small-pox was not high —some 3 to 4 per cent. These effects invariably occurred among men who had not been vaccinated in infancy. With regard to inoculation against typhoid, a small proportion showed reactions; for this reason men were excused all duties for forty-eight hours after inoculation. Experience had shown that reactions following inoculation against tetanus were non-existent or negligible. These procedures, compulsory in other European armies, were designed to afford individual protection to the soldier and to prevent epidemic disease in the Army, and so to conserve man power. Except that a man was not accepted for a normal engagement in the Regular Army unless he consented to be vaccinated, all vaccination and inoculation were voluntary.

Casualty Lists

Replying to Mr. Lees-Smith on January 30 Mr. OLIVER STANLEY said that lists of casualties sustained in action with the enemy would be published from time to time, the frequency of the lists depending on the numbers of such casualties. The lists would be of arbitrary length, covering casualties in all theatres of active operations, and would not be referable to any particular engagements. The casualties would be published under the general headings of "Killed," "Wounded," and "Missing," and usually no indication would be given of the precise date or circumstances in which the casualty occurred. No casualty would be published until the next-of-kin had been informed. Fortunately, the number of Army casualties in action had so far been small. The first list, covering the period from the outbreak of war to December 31, would be published on January 31. It contained some forty names, including wounded.

The list would also include under the heading "Died" a list of some 719 deaths from accident or disease at home and over-seas during the same period. The list might seem a long one, but having regard to the large number of personnel serving and the period covered the number was not larger than might have been expected in the circumstances. There had been no undue number of deaths from disease, although there had been a number of regrettable deaths from traffic accidents. There was a strict limit to the amount of detail that could be disclosed in casualty lists without giving useful information to the enemy.

On February 6 Mr. STANLEY told Dr. Summerskill that he could not disclose the chief illnesses responsible for the deaths of 719 men out of the first Army casualty list of 758.

Woman Medical Officer for Services Departments

On January 30 Sir FRANCIS FREMANTLE asked the Secretary of State for War if he would consider the advisability of appointing a senior woman medical officer to assist in meeting the needs of the large number of women employed by the Army. Mr. OLIVER STANLEY said that a number of women doctors, in some cases appointed to the Royal Army Medical Corps, in others employed as civil medical practitioners, were now rendering service to the Army, but the appointment of a senior woman medical officer was not at present considered necessary.

Sir KINGSLEY WOOD stated on January 31, in reply to Sir Francis Fremantle, that the services of the Royal Air Force medical organization were available for the Women's Auxiliary Air Force. The question of appointing women medical officers at stations where large numbers of Women's Auxiliary Air Force personnel are posted was under consideration. It was not at present considered necessary to appoint a senior woman medical officer.

Silicosis

Sir JOHN ANDERSON, replying on January 30 to Mr. J. Griffiths, issued the following tabulated statement showing the applications to the medical board for certificates under the Various Industries (Silicosis) Schemes from coal-miners in 1939:

	Total	Anthracite Mines
Disablement or suspension:		
Number of applications for certificates ..	850	298
Number of certificates granted	445	204
Deaths:		
Number of applications for certificates ..	128	25
Number certified as due to the disease ..	77	14

Chiropody in the R.A.M.C.

Replying to Sir Murray Sueter on February 1, Sir VICTOR WARRENDER said no chiropody section of the Royal Army Medical Corps existed. The treatment of foot defects in the Army was the responsibility of the regimental medical officer. Under his direction were the regimental chiropodist and the instructor in physical training. The former was trained normally by the medical officer, and the latter was trained in remedial treatment of foot defects at the Army School of Physical Training. Training of regimental chiropodists was at present being carried out in certain military hospitals in each Command. Further practical instruction was given under the direction of unit medical officers. The Director-General, Army Medical Services, was discussing the whole question with a deputation from the British Association of Chiropodists.

Commission on Workmen's Compensation.—The chairman of the Royal Commission on Workmen's Compensation has informed the Home Secretary that the Commission have made preparations to resume their sittings and complete their report as speedily as possible. He makes it clear that their task is a lengthy one, and that they should not be expected to present any report for some considerable time.

Private Cars on E.M.S. Business.—Officers of the Emergency Medical Service using their own motor cars when travelling on official business are paid the same allowances subject to the same conditions as those applicable to civil servants.

Notes in Brief

Rationing will reduce to about 75 lb. the annual pre-war consumption of 100 lb. of sugar per head for domestic purposes and manufacture.

A military service postponement certificate may be granted to a full-time university student if he has been studying for not less than a year for a critical examination which is to be held within nine months of the date on which he was registered under the National Service (Armed Forces) Act.

Apart from voluntary organizations the main blood transfusion organization in Kent is the Medical Research Council's depot at Maidstone. One of the functions of this depot is to stimulate public interest with a view to ensuring an adequate supply of donors. A publicity campaign has been launched and the position is now satisfactory.

Medical News

At a meeting to be held on Wednesday, February 14, at 4.15 p.m., at the Medical Society of London, 11, Chandos Street, Cavendish Square, W.1, Sir Robert Hutchison, Bt., President of the Royal College of Physicians of London, presiding, Mr. W. McAdam Eccles, M.S., F.R.C.S., will give a special address to open a discussion on "Alcohol and Road Accidents in the 'Black-out' in War."

The fourth Stanley Melville Memorial Lecture on "The Story of Protection" will be delivered by Dr. G. W. C. Kaye, F.R.S., before the Society of Radiographers at the Connaught Rooms, Great Queen Street, W.C., to-day (Saturday, February 10) at 4.30 p.m. The annual dinner of the society will be held at 6.30 p.m.

A meeting of the Tuberculosis Association will be held at 26, Portland Place, W., on Friday, February 16, at 5.10 p.m., when papers on "The Value of Mass Radiography of the Chest" will be read by Dr. P. M. D'Arcy Hart and Dr. Andrew Morland. At 8.10 p.m. there will be a discussion on "The Technical Problems connected with Mass Radiography of the Chest," to be opened by Dr. S. Cochrane Shanks and Mr. P. G. Sutton.

A meeting of the Pharmaceutical Society of Great Britain will be held at 17, Bloomsbury Square, W.C., on Tuesday, February 13, at 7.30 p.m., when Sir Walter Langdon-Brown will deliver a lecture on "How do Drugs Act?"

A meeting of the Socialist Medical Association will be held on Friday, February 16, at 8 p.m., in the Small Conway Hall, Red Lion Square, W.C., to discuss "The War and the People's Health." Admission free.

The Ministry of Health has issued to county councils and local authorities in England and Wales copies of two revised memorandums summarizing the main facts about pediculosis and scabies, and containing advice on the prevention and cure of these conditions. The memorandum on scabies is officially described as Memo. 229/Med., and the memorandum on the louse and how to deal with it as Memo. 230/Med. Each is obtainable (price 2d.) from H.M. Stationery Office or through any bookseller.

Dr. F. W. Routley, brother of Dr. T. C. Routley, the secretary of the Canadian Medical Association, is Commissioner for the National Canadian Red Cross, and now has his headquarters in London. According to a report in the Press, Canada has already subscribed over a million sterling to its Red Cross, and Dr. Routley is now preparing to collect a second million.

The Swiss Federal Council has placed 100,000 Swiss francs at the disposal of the Finnish Red Cross; and the Danish Red Cross has sent two sanitary contingents to Finland, one of them consisting of 100 doctors and 200 nurses.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

Of the commoner notifiable diseases diphtheria, scarlet fever, and whooping-cough have shown little change in England and Wales during the week, but there has been a rise in the incidence of measles and acute pneumonia (primary and influenzal), while of the less common infections the notifications of cerebrospinal fever have more than doubled.

Although diphtheria has recently been less prevalent and generally less severe, experience at South Shields has been far from favourable, despite an intensive immunization campaign. Since the beginning of 1938 as many as 1,100 cases have been reported, with 114 deaths; the high case fatality is ascribed to the prevalence of the "gravis" or starch-fermenting strain of diphtheria organism, infections with which do not respond well to antitoxin therapy. Since the beginning of 1940 there have been 23 cases and 7 reported deaths. The unsatisfactory position is due not to any defect in the method of immunization but to the fact that the proportion immunized in the susceptible population is still too small; among 12,000 subjects inoculated there has been only one death attributed to diphtheria (concurrent disease was also a factor), compared with 114 deaths among 12,000 subjects similar in all respects except that they had not been immunized.

Measles has advanced in the areas already involved, but few fresh areas have been affected to any extent, and with few exceptions the large cities have so far escaped attack in epidemic form. On the other hand, influenza has chiefly affected large cities and centres of population, and adults have been attacked much more than younger subjects. While the clinical type has been mild, consisting commonly of fever of two to three days' duration, malaise, sore throat, laryngitis, and tracheitis, the disease has been prevalent, in many instances as much as 10 per cent. or more of a community being attacked at the same time. Although the disease has fallen most heavily on those between 20 and 35, deaths, which have risen from 94 to 158, have been chiefly among older subjects. So far attempts to isolate the causative organism have not been successful; a wide variety of secondary organisms have been isolated in the acute stages of the disease—notably *Str. haemolyticus*, pneumococcus, Pfeiffer's bacillus, and *Staph. aureus*. Counties severely affected by pneumonia were: Lancaster 230 (Liverpool 39, Manchester 36); Yorks (West Riding) 153 (Sheffield 48, Leeds 10); London 99 (twenty-five boroughs affected—notably Battersea 12, Wandsworth 11, Woolwich 14); Durham 79 (Sunderland 29); Warwick 68 (Birmingham 46, Coventry 11); Glamorgan 63 (Rhondda U.D. 15, Swansea 6). On the other hand, measles was most rife in Cumberland 293 (Carlisle 165); Lancaster 396 (Blackburn 42, Blackpool 59, St. Helens 66, and in Liverpool and Manchester only 8 and 9 respectively); Glamorgan 220 (Swansea 115, Merthyr Tydfil 14, Rhondda 42); Durham 142 (Bishop Auckland 44, Sunderland 9); Yorks (West Riding) 115, scattered widely in urban and rural districts; in Sheffield 5 and in Leeds 1. In Belfast cases have risen from 135 to 273 and there were 3 deaths, the same as in the previous week.

Although there has been an increase in the incidence of cerebrospinal fever, both in England and Wales and in Scotland, no particular centre or focus can be incriminated as being responsible, nor do the official figures give any clue whether non-civilians are chiefly attacked, apart from the Wrexham outbreak, in which the disease was at first confined almost entirely to Service cases but later spread to the civilian population. Of the sixty-one administrative areas in England and Wales thirty-six reported cases of cerebrospinal fever, but only in fifteen were there more than 2 cases during the week: Chester 3 (Wallasey C.B. 1, Neston U.D. 1, Runcorn U.D. 1); Durham 4 (Gateshead C.B. 1, Barnard Castle R.D. 3); Essex 4 (Colchester M.B. 2, Wanstead and Woodford M.B. 2); Lancaster 10 (Barrow-in-Furness C.B. 2, Bolton 1, Liverpool 3, Manchester 2, Atherton U.D. 1, Salford 1); London 5 (Lambeth, Lewisham, Poplar, Southwark, Westminster); Middlesex 5 (Hendon 1, Heston and Isleworth 1, Uxbridge U.D. 3); Northumberland 4 (Tynemouth C.B. 1, Hexham U.D. 1, Alnwick R.D. 1, Hexham R.D. 1); Salop 3 (Shrewsbury M.B. 2, Oswestry R.D. 1); Southampton 4 (Portsmouth 1, Aldershot M.B. 2, Fareham U.D. 1); Stafford 5 (Smethwick C.B. 1, Wolverhampton C.B. 1, Amblecote U.D. 1, Cannock U.D. 1, Stafford M.B. 1); Surrey 5 (Coulsdon and Purley U.D. 1, Godalming M.B. 1, Richmond M.B. 1, Sutton and Cheam M.B. 1, Hambledon rural 1); Warwick 6 (Birmingham 3, Coventry C.B. 2, Rugby M.B. 1); Denbigh 5 (Wrexham M.B. 1, Wrexham rural 4); Glamorgan 6 (Merthyr Tydfil C.B. 1, Penarth U.D. 1, Rhondda U.D. 3, Cowbridge R.D. 1); Monmouth 8 (Newport C.B. 3, Nantyglo and Blaina U.D. 1, Risca U.D. 1, Chepstow R.D. 2, Pontypool 1). Of the 23 cases reported in Scotland 13 were in counties (Berwick 1, Dumfries 1, Inverness 2, Moray and Nairn 2, Orkney 2, Renfrew 2, Ross and Cromarty 2, Zetland 1) and 10 in boroughs (Aberdeen 3, Glasgow 5, Inverness 1, Clydebank 1). In Eire there were 8 cases (none in the previous week): 2 in Dublin and 6 in Idrone, Co. Carlow.

No. 2

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended January 13, 1940.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1940					1939 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	107	5	23	8	—	43	4	15	1	—
Deaths		3	—				1	2		
Diphtheria	745	27	204	65	48	1,186	118	232	44	21
Deaths	17	—	5	1	1	32	4	6	1	1
Dysentery	31	3	13		—	38	9	15		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	8	—	—			1	1	—		—
Deaths		—	3				—	1		
Enteric (typhoid and paratyphoid) fever	11	1	2	7	4	21	3	3	11	3
Deaths	—	—	—	—	—	4	—	—	—	—
Erysipelas			67	8	7			75	5	5
Deaths		—	1				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	32	3	11	5	3	52	12	11	9	2
Measles	2,740	33	27		278		21	35		3
Deaths	1	—	1	2	3	3	—	—	—	—
Ophthalmia neonatorum	66	9	15		1	102	11	29		2
Deaths										
Pneumonia, influenzal*	1,457	99	63	12	9	1,793	185	81	18	69
Deaths (from influenza)	158	14	38	2	7	214	19	35	6	7
Pneumonia, primary			545	17				421	28	
Deaths				19	6		28		31	24
Polio-encephalitis, acute	4	—				—	—			
Deaths							—			
Poliomyelitis, acute	6	—	—	—	—	17	3	—	1	1
Deaths			—				—	—		
Puerperal fever		4	7	8	1	2	2	17	1	
Deaths		1†					—			
Puerperal pyrexia	159‡	7	12		1	174	8	19		5
Deaths										
Relapsing fever	—	—			—	1	—			—
Deaths										
Scarlet fever	1,141	38	154	64	84	1,565	99	298	48	80
Deaths	1	—	1	—	1	3	—	2	—	—
Small-pox	1	—	—		—	1	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	787	22	23		14		242	778		20
Deaths	5	—	—	—	—	14	3	14	2	2
Deaths (0-1 year)	415	62	96	37	22	482	79	65	37	38
Infant mortality rate (per 1,000 live births)						73	64			
Deaths (excluding stillbirths)	8,269	1,530	1,215	312	174	6,890	1,302	949	318	233
Annual death rate (per 1,000 persons living)			24.6	20.8	15.3	16.9	16.6	19.3	21.4	20.7
Live births	6,663	2,049	902	339	263	6,596	1,120	911	389	252
Annual rate per 1,000 persons living			18.3	22.6	23.1	16.2	14.3	18.6	26.2	22.3
Stillbirths	259	29	50			263	36	36		
Rate per 1,000 total births (including stillborn)						38	31			

* Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

† Death from puerperal sepsis. ‡ Includes figures for puerperal fever.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Chronic Muco-purulent Otorrhoea

Dr. S. A. MONTGOMERY (Bournemouth) writes: After an experience of Calot's solution of over eight years I should like to confirm all that Mr. Hassan Shaheen (February 3, p. 200) has to say in praise of its usefulness in chronic muco-purulent otorrhoea. Might I add that in its preparation the liquid paraffin used requires to be sterilized by boiling for thirty minutes and allowed to cool before the other ingredients are added in the following order: creosote, guaiacol, iodoform (sterile), and, lastly, ether.

Income Tax

Relief for Falling Incomes

"A." was in practice and was called up on September 30, 1939. His assessment for 1939–40—based on his accounts to March 31, 1939—is £1,200. His actual civil earnings for the year to March 31, 1940, will, it is assumed, turn out to be £800. Can he claim relief under Section 11, Finance (No. 2) Act, 1939? (N.B.—The above figure of £800 represents a normal half-year's working plus £150 receivable under the Protection of Practices Bureau.)

*** Assuming the half-year's Army pay to be £250, the comparison between the "assessed" and the "actual" earned income is as follows:

	Assessed	*Actual*
Profits of practice	£1,200	£800
Army pay	£250	£250
	£1,450	£1,050

The diminution exceeds 20 per cent. of the assessed earnings and is clearly due to the war. "A" can therefore claim under Section 11 to have an adjustment of the second instalment of tax for 1939–40 to such an extent as will leave him to pay on the amount of his actual earnings for 1939–40—that is, £1,050 and not £1,450. If, however, his practice earnings for 1938–9 (that is, £1,200) exceeded his assessment for 1938–9, the relief for 1939–40 is subject to a restriction to leave him in the position of paying for each of those years on the amounts of the actual earnings of those years. In connexion with the above example some further points have been raised, and are covered by the following notes:

1. Where a practitioner is called up the point will sometimes arise as to whether he can—and, if so, whether in his own interests he should—claim to treat his practice as having "ceased." If, as may be assumed, the work of the practice is being carried on under the B.M.A. Model Scheme or by a personal deputy the practice has not ceased—in fact, arrangements have been made for the purpose of keeping it in being. Further, Section 11 appears to give all the relief that a "cessation" claim could provide, with the added advantage that, as the law stands, the previous year's basis can be claimed, to the practitioner's clear advantage, on termination of military service.

2. As the practice is continuing, though in a changed form, any receipts from the Model Scheme, etc., are assessable under Case II in the ordinary way and not under Case VI.

3. Where a partner is called up there will normally be some change in the terms of the agreement. The effect of the change should be applied to the division of the firm's liability among the partners as from the date it operates between them, and therefore will affect the calculation of both "assessed" and "actual" earnings. The shares so calculated should be incorporated in the aggregates as shown in the example above. The income will, we presume, continue to be treated as "earned" income.

4. It is pointed out that a practitioner assessed on the cash basis may suffer as compared with another assessed on the earnings basis, because cash receipts will continue to be received from the pre-war normal working of the practice. We agree. Taking the profession as a whole, a possible answer is that practitioners who suffer now will benefit by the maintenance of the cash basis after they return from military service. We think that the Revenue authorities might be willing to set aside the cash basis in favour of the earnings basis for 1939–40—as regards both assessable and actual profits, but in many cases that would create other difficulties. In a partnership case, for instance, the other partners might be averse to a change in the basis of the firm's assessment, and the profits of the practice year 1937–8 might have to be similarly calculated to satisfy the proviso as to a possible excess of actual over assessed income for the financial year 1938–9. We do not think that a concession could be obtained under which the cash basis was left in operation but receipts for pre-war work were excluded. The Revenue has always insisted that the cash basis should be applied without modification or not at all, and we should not expect that rule to be departed from even for this special war relief.

LETTERS, NOTES, ETC.

Salicylate of Soda for Influenza

Dr. J. T. MACLACHLAN (Dornoch) writes: As influenza appears to be prevalent just now I would like to draw attention to the value of salicylate of soda in its treatment. But a casual dose of aspirin or salicylate of soda is not sufficient. For the common type of influenza, beginning with headache, sharp rise of temperature, and severe myalgic pains, salicylate of soda should be given in the same way as it is given for rheumatic fever. In Scotland I found 20 grains for a man and 15 grains for a woman, given every two hours for five or six doses, a reliable specific. Not more than 100 to 120 grains will be required for a man till the temperature is normal and the influenza gone, when tonics are required. Although I have treated hundreds of cases of influenza in a city practice I have seen very few cases of pneumonia. Hence I am forced to the conclusion that the salicylate of soda treatment is not only specific for the rheumatic type of influenza but actually prevents such complications as pneumonia, etc.

Medical Diary

We have received from Messrs. Bayer Products, Ltd., their *Medical Diary and Therapeutic Index for 1940*. This gives a list of the more important products issued by this firm, short sections on the application of these in different conditions, and useful information on such matters as infectious diseases and calorie values and vitamin contents of foodstuffs, in addition to the diary pages proper.

Disclaimer

Dr. HILDRED CARLILL writes: The late extra edition of the *Evening News* of February 2 contained my likeness together with a short biography and statements of the opinion of someone who appeared to know me but of whose identity I am unaware. My attention to the matter was called by telephone on February 2 at 6.30 p.m. Before that hour I had no knowledge, direct or indirect, of any circumstances relating to that portion of the paper's activities or to the likelihood of appearing in print or to the intention of anyone to publish or print anything about me in the newspapers at any time.